JUL 28 1919
UNIV. OF MICH.

under the Act of March 3, 1879.

AMERICAN JOURNAL OF PHARMACY

PUBLISHED MONTHLY BY THE

Philadelphia College of Pharmacy

A Record of the Progress of Pharmacy and The Allied Sciences

PUBLICATION COMMITTEE

CHARLES H. LAWALL, PH.M. — GEORGE M. BERINGER, PH.M.
JOSEPH W. ENGLAND, PH.M. — JULIUS W. STURMER, PHAR.D.
JOHN K. THUM, PH.M. — E. FULLERTON COOK, PH.M.
ROBERT P. FISCHELIS, B.Sc., PHAR.D.
GEORGE M. BERINGER, A.M., PH.M., Editor

VOL. 91 — JULY, 1919 — No. 7

CONTENTS

Editorial
The Pharmaceutical Sign-Boards All Point Toward New York . . . 403
Journalistic Courtesy . . . 404
How Pharmacists May Obtain Distilled Spirits and Wines for Medical and Pharmaceutical Purposes . . . 406
A Standard Dosage Measure, With Illustration. By George M. Beringer, Ph.M., Camden, N. J. . . . 414
Secret—Private—Personal. (No. III—Private.) By John Uri Lloyd, Phar.M., Cincinnati, Ohio . . . 419
On the Stability of Digitalis Leaf Extracts (First Paper). By James M. Schmidt and Frederick W. Heyl, Kalamazoo, Mich. . . . 425
The Cultivation of Aromatic Plants in the United States. By P. H. Todd, Kalamazoo, Mich. . . . 437
Advertising. By Jacob Diner, Ph.G., M.D., New York, N. Y. . . . 441
Sir William Crookes. By Samuel P. Sadtler, Ph.D., Philadelphia, Pa. . . . 444
James Michenor Good, With Portrait. By Henry M. Whelpley, Ph.M., St. Louis, Mo. . . . 447
A Bill To Improve the Status of the Hospital Corps of the United States Navy . . . 452
Pharmacy in the Italian Army. From the Chemist and Druggist . . . 455
The Purity of Commercial Aspirin and Aspirin Tablets. By A. J. Jones, Liverpool, Eng. . . . 461
The Chemical Assay of Foxglove. By Tschirch and Wolter . . . 471
Lipovaccines—From Journal of the American Medical Association . . . 473
Chloramine-T as an Intestinal Antiseptic. From The Prescriber . . . 474
Note on the Preparation of Glycerin by Fermentation . . . 476
The 98th Annual Commencement Exercises of the Philadelphia College of Pharmacy . . . 477
News Items and Personal Notes . . . 483
Book Reviews . . . 486

Price, $3.00 per Annum, in advance. Issued in Monthly numbers of not less than 48 pages. Single Numbers, 30 Cents. Back Numbers, 50 Cents.

Address all communications

For the Editor: To American Journal of Pharmacy, 145 North Tenth Street, Philadelphia, Pa.

For the Business Manager: To Harold J. LaWall, Business Mgr., 145 North Tenth Street, Philadelphia, Pa.

Publication Office—21 North Queen Street, Lancaster, Pa.

New Editions of Standard Works for Students and Pharmacists

REMINGTON'S PRACTICE OF PHARMACY
(SIXTH EDITION)

All of the best features of the Fifth Edition are retained and many new ones added. It is based upon the latest revisions of the U. S. Pharmacopoeia (IX) and the National Formulary (IV). The "New Remington" is issued in two volumes for the convenience of students, and in one complete volume.

TWO STYLES OF BINDING

Volume I and II, regular Cloth Binding, each - - - $4.50 net
One Volume Complete. Bound in Buckram, very durable $8.00 net

UNITED STATES DISPENSATORY
20th EDITION

The Editorial Staff

PROF. JOSEPH P. REMINGTON
PROF. SAMUEL P. SADTLER, PH.D.
JOHN F. ANDERSON, M.D.
PROF. H. C. WOOD, JR., M.D.
PROF. HENRY KRAEMER, PH.D.
PROF. CHAS. H. LAWALL, PH.D.

Completely reset. 2150 pages. Revised throughout upon the U. S. Pharmacopoeia (IX) and the National Formulary (IV). Thoroughly up-to-date. Hundreds of new articles beside the official ones. Printed from new double column plates.

Bound in durable buckram, $12.00 net. With Patent Thumb Index, $12.50 net

Order from your Wholesale Druggist or

J. B. LIPPINCOTT COMPANY
Publishers **PHILADELPHIA**

Our Readers will find it to their advantage to carefully consult the advertising pages when desiring to correspond with STRICTLY FIRST-CLASS PARTIES

American Journal of Pharmacy

ESTABLISHED IN 1825

Four preliminary numbers were published at different times until in 1829, when the publication of the regular volumes began. Since then the publication has been uninterrupted. During the period from 1829 to 1852 four numbers were published annually, except in 1847, when five numbers were published. From 1853 to 1870 six numbers were published. Since this time twelve numbers have been published annually.

MANUSCRIPTS should be sent to the Editor. It should be stated in this connection that the Editor does not assume any responsibility in connection with the views or investigations of contributors, other than to exercise general care in the selection of matter.

Contributors are allowed a reasonable number of copies of this JOURNAL, free of charge, if applied for when the proof is returned.

REPRINTS, if desired, must be applied for when the proof is returned. The table below shows the *approximate* cost of reprints, the make-up of the pages to be identically the same as in the JOURNAL. The actual cost may vary from the figures given, and will depend upon the amount of presswork, paper, binding, etc. Reprints containing half-tones may be expected to cost somewhat more than the rates given.

	2 pp.	4 pp.	8 pp.	16 pp.	COVERS WITH TITLES
25 copies	$2.25	$3.75	$7.75	$9.00	25 copies $1.75
50 "	2.50	4.00	8.25	9.75	50 " 2.00
100 "	3.75	4.25	9.00	10.75	100 " 2.25
250 "	3.75	4.75	10.00	12.00	250 " 2.75

THE AMERICAN
JOURNAL OF PHARMACY

JULY, 1919

EDITORIAL.

THE PHARMACEUTICAL SIGN-BOARDS ALL POINT TOWARD NEW YORK.

The sixty-seventh Annual Convention of the American Pharmaceutical Association to be held in New York City during the week commencing August 25, bids fair to be a most memorable occasion. The headquarters will be at the new and commodious Hotel Pennsylvania, said to be the largest and most modern hotel structure in the world.

The Local Committee advises that the management of the hotel has promised to supply the best of facilities for the meetings of the Association and its Council and Committees and the various allied organizations that are scheduled to meet during the same week and the best service that New York can supply. Notwithstanding the many hostelries of the metropolis, the demand for hotel accommodations in New York has at times, during the recent years, exceeded the rooms available. Hence, despite the enormous size of the Hotel Pennsylvania, the local committee advises that reservations for the week of the convention be made early.

In celebration of the "Victory Year" special consideration is to be given to the entertainment features and the ladies are especially invited to attend and these functions are guaranteed to make their visit to New York enjoyable and a pleasant memory for all time to come.

The various Sections and Committees are earnestly working to present interesting and progressive programmes. The chairman of the Scientific Section writes that it is the intent to devote the entire time of one of its sessions to the consideration of the scientific

phases of pharmacopœial revision and that papers on the leading topics of the pharmacopœia will form the basis for this discussion. This should prove both timely and profitable as we are rapidly approaching the date set for the meeting of the Pharmacopœial Convention.

The pre-convention announcement of the Section on Commercial Interest shows a well-selected list of topics including addresses by several teachers of scientific commercial education in prominent universities.

Dr. Henry M. Whelpley will deliver before the Historical Section one of his brilliant lectures. He is a past master in all matters relating to the lore and customs of the American Indian. In fact he is accredited with being one of the "Two Big Indian Chiefs of Missouri."

Equally interesting and instructive programmes are offered by the Sections on Education and Legislation and of Practical Pharmacy and Dispensing and it goes without saying that the Women's Section will not be behind the other sections.

Besides all of these announced topics there are many subjects and events affecting pharmacy in this period of great reformation and world recasting that are sure to be discussed as well as many other matters that may be considered as purely intra-association.

The pharmacist who misses this meeting will ever regret it. The Local Committee have laid their plans for a largely attended, enthusiastic "Victory Meeting" and the pre-convention arrangements all indicate a fine and continuous feast of knowledge and enjoyment.

G. M. B.

JOURNALISTIC COURTESY.

Strange as it may appear to some, the editor of a magazine, journal, newspaper, or a publication of any standing whatever, appreciates that he has responsibilities, both moral and material, that he must discharge. Hence, there are certain well-known principles of journalism that belong properly to the editors' code of ethics. Not the least of these is to keep his publication free from the charge of plagiarism.

There are two underlying reasons that make such a course of procedure essential and both of these are based upon the principle

of common honesty. Journalistic courtesy alone should determine that due credit be given alike to the author and to the source of original publication and any other course is simply the appropriation of another's rights and property and a violation of this law of the decalogue. Moreover, the palming off of a prior publication as an original contribution of the author or even the abstracting of an article without giving credit to the original publication, is a deliberate act of deception practiced against the subscribers of the journal and is even less pardonable than the ordinary deceptions of trade.

The AMERICAN JOURNAL OF PHARMACY scrupulously adheres to the principle of giving with each article the source of the original publication and, if an abstract, tracing wherever possible the course of the preparation of such abstract. This is simply an upright recognition of our obligation to be honest with authors and readers alike and an observance of the just rule to give honor and credit to those to whom such is due. It is not the intent of the publishers of this JOURNAL to claim absolute ownership of the papers and contributions published originally therein. Neither is it our purpose to copyright or otherwise limit republication. To the contrary we welcome the widest distribution of every item of information of value to pharmacists or others and after publication the articles are subject to such use. We do, however, insist that in all such republications of papers and articles originally published in the AMERICAN JOURNAL OF PHARMACY there should be appended a statement crediting the original publication.

We recognize that most of the contemporary pharmaceutical journals are conscientiously observing this principle of journalistic courtesy. A study of the current literature will, however, show that there are a few editors who are negligent and at times exceedingly careless in their observance of this editorial propriety. There is now before the writer a current pharmaceutical journal whose pages are almost entirely filled with copied articles for which, with one exception, no credit is given to the original publication and of these three are copied from the pages of the AMERICAN JOURNAL OF PHARMACY. A most charitable view will not permit one to attribute such an example of plagiarism to "subconscious absorption."

G. M. B.

HOW PHARMACISTS MAY OBTAIN DISTILLED SPIRITS AND WINES FOR MEDICINAL AND PHARMACEUTICAL PURPOSES.

The prohibition wave that has overflowed our country with its associated extreme, yet imperfect, legislation has created new problems and difficulties for pharmacy. With the sale of beverage spirits of any kind whatsoever, either distilled, vinous or malted we are not at all concerned. In our opinion ethical pharmacy has nothing whatever to do with the sale or handling of beverage liquors and any pharmacist who will sell his professional birthright by engaging in such traffic should have his license to practice pharmacy cancelled and he should forever be debarred from the profession that he has disgraced.

The zealot, blinded by ignorance or bigotry, may fail to appreciate the indisplaceable position that alcohol holds as an essential ingredient for the preparation or preservation of many medicines. Many of the propositions submitted in Congress and in the State Legislatures are exhibitions of fanaticism and woeful ignorance of the needs of medicine and pharmacy. It is fortunate that, up to the present time, the rational legislators have been in the majority and the several federal acts as well as the prohibition Amendment to the U. S. Constitution recognize that there are legitimate uses in medicine for distilled spirits and wines and exempt from the severe provisions of these laws such for "*medicinal,* and other non-beverage purposes."

Our investigations convince us that the preponderance of opinion among practicing physicians is that there is a legitimate and necessary use for certain distilled spirits and wines as medicinal agents. To the ethical physician and pharmacist distilled or vinous spirits have no other significance than that of articles of materia medica. When indicated in the judgment of the physician he will prescribe these and the prescriptions for such will be compounded just the same as in other cases where he may prescribe epsom salt, potassium bromide or nux-vomica.

As representing pharmaceutical and medical interests we are concerned when the materia medica is restricted by either legislation or departmental regulation. To jeopardize the lives of our sick by restricting the remedial agents at the command of the physician would be a national crime and not less heinous because dictated by radicalism and fanaticism.

Wines have been used as solvents or vehicles for medicines from time immemorial and for some years past the Federal Departments, for economic reasons, have encouraged the use of native wines in the preparation of medicines and other manufactured products. As a result of established custom and stimulated consumption there are in use many formulas in which wine is an essential ingredient and nearly a score of such formulas are officially recognized in the National Formulary.

So it became a question of importance to pharmacists as to how they are to secure supplies of non-beverage distilled spirits and wines for dispensing on legitimate prescriptions and likewise that needed for manufacturing the formulas of the N. F. as well as those of foreign pharmacapœias and formularies in which wine is directed. The Internal Revenue Department has a difficult task to perform in the framing of regulations that will permit of the use of alcohol, potable distilled spirits, and wines for purely medicinal uses and exclusively non-beverage purposes and at the same time protect against fraud and violation of the acts and in this they should have the most cordial support and coöperation of pharmacists.

Our sense of duty in this matter, we believe, justified the taking up of various phases of this question with the officials of the Department by interview and correspondence and the offering of suggestions by which pharmacists who have given bond and have permit to withdraw non-beverage alcohol for use and sale may have such bond and permit extended to cover likewise the withdrawal of non-beverage potable distilled spirits and wines for purely medicinal and pharmaceutical purposes.

The following copies of portions of the correspondence relating to the pharmaceutical uses of wines are published for the advice of pharmacists.

June 6, 1919.

HON. H. M. GAYLORD,
Deputy Commissioner of Internal Revenue,
Treasury Department,
Washington, D. C.

My dear Sir:

Pursuant to your request in our recent interview, I have decided to address two distinct letters to you, this one relating to the prob-

lems confronting pharmacists and the Committee on Revision of the National Formulary concerning the use of wines for manufacturing the formulas of the National Formulary and other formularies and pharmacopœias in order that your ruling on this point may be placed before the Committee on Revision of the National Formulary.

In my former letter of April 17, 1919, addressed to the Hon. Daniel S. Roper, Commissioner of Internal Revenue, I propounded the following distinct query:

"Will pharmacists be permitted under their bond covering the use of non-beverage alcohol to likewise withdraw non-beverage wines for the purpose of manufacturing these formulas, and the formulas for medicinal wines official in some of the foreign pharmacopœias, which in this country are more or less prescribed on prescriptions?"

As no ruling has yet been promulgated on this point, I am repeating the query in accordance with our understanding so that it may receive your personal consideration and decision.

I trust that this will be rendered at an early date so the information may be imparted to the members of the Committee on Revision of the National Formulary and likewise to the pharmacists who are necessarily interested.

I am,

Very truly yours,
GEORGE M. BERINGER,
Editor.

TREASURY DEPARTMENT.

WASHINGTON, D. C.,
June 16, 1919.

GEORGE M. BERINGER, *Editor,*
American Journal of Pharmacy,
145 N. 10th Street,
Phila., Pa.

Sir:

Receipt is acknowledged of your letter dated June 6, 1919, in which you ask whether pharmacists will be permitted under their bond covering the use of non-beverage alcohol, to likewise withdraw non-beverage wines for the purpose of manufacturing formulas of the National Formulary and other formularies and pharmacopœias; and also whether non-beverage wines may be used in formulas for

medicinal wines official in some of the foreign pharmacopœias, which in this country are more or less prescribed on prescriptions.

In reply your attention is called to T. D. 2788, copy of which is enclosed, from which you will note that, in order to be entitled to obtain non-beverage wines for the purposes mentioned in your letter, it is necessary to qualify by obtaining permit and giving bond. The bond given covering the use or sale of non-beverage spirits is not sufficient to cover, in addition, the use or sale of non-beverage wines, and therefore, if it is desired to use or sell both spirits and wines it will be necessary to give a bond covering both these articles in the form prescribed in the above Treasury Decision. Also a permit must be procured covering the use of non-beverage wines in specific preparations, for, as in the case of non-beverage spirits, non-beverage wines may be used only as expressly stated in the permit.

Non-beverage wines may be in the production of medicinal preparations, including those official in some of the foreign pharmacopœias, not contained in the U. S. P. or N. F., provided the sworn data and samples called for in T. D. 2788 are submitted, and permit is obtained and bond filed covering the manufacture of such preparations.

An additional letter dated June 6, 1919, has also been received by this Bureau from you, in reference to the use of potable distilled spirits and wines as such for medicinal purposes. This letter will be considered by this Bureau and you will be advised at a later date of the conclusion reached.

Respectfully,

(Signed) H. M. GAYLORD,
Deputy Commissioner.

As a necessity, most pharmacists have already given bond and obtained the permit to obtain alcohol for sale or use as non-beverage spirits but as a rule the form used did not cover the use or sale of non-beverage wine. From the above decision, it is apparent that to secure wines for the *purpose of manufacturing* non-beverage articles, such as wine of beef and iron or other N. F. formulas, he must either amend his bond for the withdrawal of non-beverage alcohol or file a new bond that will cover wines for such purpose as well as alcohol.

The pharmacist must, however, bear in mind that this decision

does not cover the dispensing of potable distilled spirits or wines as medicines even when sold legitimately on prescription. The following Regulation of the Internal Revenue Department, promulgated June 30, specifically applies to the sale or dispensing of distilled spirits or wines for medical uses.

To Collectors of Internal Revenue and Internal Revenue Agents in Charge:

Section 1 of the Act of November 21, 1918 (War Prohibition Law), provides that after June 30, 1919, until the conclusion of the present war, and thereafter until the termination of demobilization, the date of which shall be determined and proclaimed by the President, no distilled spirits held in bond shall be removed therefrom for beverage purposes, except for export; also that no beer, wine or other intoxicating or vinous liquors shall be sold for beverage purposes, except for export. It authorizes the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, to prescribe rules and regulations regarding the manufacture and sale of distilled spirits and removal of distilled spirits held in bond for other than beverage purposes, and to govern the manufacture, sale, and distribution of wines for sacramental, medicinal, or other than beverage uses.

In view of these provisions and of the further fact that the Commissioner has jurisdiction under the general revenue laws over spirits and wines on bonded premises and withdrawals from bond for export, the following instructions are issued;

Exports.

The existing regulations governing the export of wines tax free (T. D. 2416 and 2505), and governing the export of spirits free of tax or with benefit of drawback (Regs. No. 29), will continue in force and effect for the export of wines or distilled spirits during the war prohibition period.

If circumstances arise in connection with such exports to which the regulations seem inapplicable, or which they do not fully provide for, all such circumstances should be submitted for specific ruling.

Medical Uses of Wines and Spirits.

Physicians may prescribe wines and liquors, for internal use, or alcohol for external uses, but in every such case each prescription

shall be in duplicate, and both copies be signed in the physician's handwriting. The quantity prescribed for a single patient at a given time shall not exceed one quart. In no case shall a physician prescribe alcoholic liquors unless the patient is under his constant personal supervision.

All prescriptions shall indicate clearly the name and address of the patient, including street and apartment number, if any, the date when written, the condition or illness for which prescribed, and the name of the pharmacist to whom the prescription is to be presented for filling.

The physician shall keep a record in which a separate page or pages shall be allotted each patient for whom alcoholic liquors are prescribed, and shall enter therein, under the patient's name and address, the date of each prescription, amount and kind of liquors dispensed by each prescription, and the name of the pharmacist filling the same.

Any licensed pharmacist or druggist may fill such prescriptions (1) if his name appears on the prescription in the physician's handwriting, and (2) if he has made application and received permit, Form 737, in accordance with the provisions of T. D. 2788, and (3) if he has qualified as retail liquor dealer, by the payment of special tax. No such prescription may be refilled.

Druggists filling these prescriptions shall preserve in a separate, carefully guarded file, one copy of every prescription filled, and once a month shall transmit to the collector of internal revenue a list showing the names of the physicians, the names of the patients, and the total quantity dispensed to each patient during the month. These lists shall be subject to immediate examination and frequent review in the collectors' offices, and wherever there is indicated either (1) that a physician is prescribing more than normal quantities, or (2) that any patient, through the services of one or more than one physician, is procuring more than a normal quantity, the collector shall report the facts to the Commissioner and the U. S. Attorney.

Pharmacists should refuse to fill prescriptions if they have any reason to believe that physicians are dispensing for other than strictly legitimate medicinal uses, or that a patient is securing, through one or more physicians, quantities in excess of the amount required for legitimate uses.

Wholesale or retail liquor dealers having stocks of wines or liquors on hand, may sell to pharmacists holding permit, upon re-

ceipt of order on Form 739 and in conformity with the provisions of T. D. 2788, until their present supplies are exhausted. Such orders may be filled from spirits taxpaid at the $6.40 rate.

Wholesale or retail liquor dealers who are not licensed druggists or pharmacists will not be permitted to qualify, after their present stocks are exhausted, to deal in either beverage or non-beverage spirits.

Wholesale pharmacists may continue to qualify for the sale of liquors or wines for non-beverage purposes, in conformity with the provisions of T. D. 2788.

Non-beverage alcohol, tax-paid at the rate of $2.20 per gallon may be used in filling prescriptions for spirits or alcohol so medicated or denatured in accordance with existing regulations as to be unfit for beverage use. In filling prescriptions for spirits or alcohol not so medicated or denatured as to render it unfit for beverage use, liquor tax-paid at the rate of $6.40 per gallon only must be used.

Tax-paid wine must be used in all cases.

Sacramental Wines Produced under Clerical Supervision.

The procedure outlined in T. D. 2765 for the production of wines in quantities not exceeding 1,000 gallons should be followed where wines are produced for sacramental purposes by churches or religious orders, and the production and distribution is entirely under clerical supervision. Such wines may be removed from the premises where produced, in accordance with the provision of T. D. 2788. The labels required by that T. D. may be omitted.

The details of the procedure outlined in the two Treasury Decisions mentioned will be furnished to any interested person, by the collector of internal revenue for the district in which the wines are produced.

If objections are made to collectors that the provisions of the Treasury Decisions are inapplicable to the established procedure of any recognized religious body, and that they impede or interfere with historic rites or customs, the collector will carefully investigate the facts and make full report to the Commissioner in order that it may be determined whether the regulations should be modified to meet the needs of the particular case. Wine used for sacramental purposes is subject to tax.

GENERAL INSTRUCTIONS.

All inquiries relating to the methods of shipping wines or spirits in filling non-beverage orders should be made to the local representative of the United States Railroad Administration.

The Department of Justice has exclusive jurisdiction to enforce the prohibition provisions of the Act of November 21, 1918 (War Prohibition Law). Accordingly it should be suggested to all persons making inquiry as to the prohibition provisions of the Act that they address either the Attorney General or the local United States Attorney. Similarly, when internal revenue officers become aware of apparent violations of the prohibition provisions of the Act, they should report such facts as come to their attention to the local officers of the Department of Justice. They will coöperate with the Department of Justice agents if such coöperation is requested.

The regulations and instructions regarding the use of non-beverage spirits and alcohol for purposes other than those specifically dealt with herein will continue in effect.

Where there is evidence that wine or liquor obtained actually or ostensibly for sacramental, medicinal, or non-beverage purposes has been used for beverage purposes it shall be reported to the Commissioner for assertion of additional tax liability, and to the United States Attorney for prosecution under the Internal Revenue laws.

So long as the taxes on alcoholic liquor and on occupations connected with the production and sale of alcoholic beverages remain in force they must be enforced. The Attorney General has advised this Department that the fact that an occupation or the production or sale of a beverage is prohibited does not relieve those engaged in such occupation of producing or selling the beverage from tax liability. It must, however, be clearly understood that payment of tax in no way conveys any right to act contrary to or to be exempt from liabilities imposed by the prohibition legislation. The result of the statutes imposing the taxes and prohibiting the traffic is that the same person may incur liability to tax and at the same time be liable to prosecution under the prohibition laws.

DANIEL C. ROPER,
Commissioner of Internal Revenue.

APPROVED:

CARTER GLASS,
Secretary of the Treasury.

There are several features of this regulation that call for comment. The pharmacist who desires to avail himself of this privilege must see that his bond given for *non-beverage* spirits and wines and the permit obtained covers the sale of such as medicines and on prescription and then *must again take out the objectionable tax stamp as a retail liquor dealer,* as if actually engaged in the sale of *beverage* liquors. Further, under the provisions of the Revenue Act of 1918, if he is engaged in such business in a state or district that is under prohibition legislation, in which the state act or local ordinance does not exempt the sale of liquors for medicinal purposes, then he must pay the special tax of $1,000. In our opinion *no pharmacist in the discharge of his professional services in any community, will be warranted to pay $1,000 for the right to dispense any or all classes of medicines.* The principle is absolutely wrong, ethical pharmacy should be totally divorced from the business of the liquor dealer and such has always been the contention of pharmacists.

It is observed that the regulations do not provide for the handling or supplying on prescription or otherwise of malted liquors and even if the requirements as stated are met and the R. L. D. stamp secured this carries with it no right to sell or dispense the so-called "extracts of malt," unless they contain not less than twelve per cent. of malt solids, until such time as by presidential proclamation the provisions of the War Prohibition Law shall be terminated.

G. M. B.

A STANDARD DOSAGE MEASURE.[1]

By George M. Beringer, Ph.M.,

Camden, N. J.

Accuracy in the compounding of medicines is a first principle instilled into the mind of a pharmacist, and so he realizes fully the importance of correct weights and measures. This is a matter that is now also receiving official attention in some of the states, where the scales, weights and measures of the pharmacists, the same as those of other merchants, are periodically inspected by a representative of the state or municipal department of weights and measures.

[1] Presented at the annual meeting of the New Jersey Pharmaceutical Association, Atlantic City, June 11, 1919.

While in the past the apothecary may have used graduated measures of variable shapes and with indifferent and inaccurate markings, today he is supplied by the manufacturers with "standard graduates" the shapes and graduation of which have been standardized with the coöperation of the United States Bureau of Standards and the use of which is already compulsory by statutes in some of the states.

Accuracy in the administration of medicines is equally as important as accuracy in their preparation. The physician calculates the amount of active medicament that he intends shall be given his patient in each dose of the prescription that he directs. To the trained physician the word dose has a well-defined meaning, namely, the right amount to obtain the desired effect, no more and no less. So it is evident that if too much be given untoward effects or undesirable reactions may result and that if too little be given there may be expected a failure to produce any effect. In either case, the intent of the physician may be nullified with detriment to his patient. It is the height of inconsistency to invalidate the judgment, the professional knowledge and skill of the physician and the pharmacist and to make these useless by the careless or inaccurate administration of the medicines.

The inaccuracy of the ordinary dose measures has been so frequently decried that the variability and uncertainty of these should be common knowledge. The almost universal custom is for the physician to direct as a dose of a liquid medicine, either a teaspoonful, a dessertspoonful, a tablespoonful, or possibly so many drops. Spoons of all sizes and shapes are marketed by the various manufacturers without any attempt to standardize the content of those bearing the same designation. In the same household one teaspoon may hold 55 minims and another as much as 80 minims and as great a range of variation may be shown by the dessertspoons and the tablespoons. Another source of error in measuring with the ordinary metal spoon, is what may be termed the personal equation. One person does not hold the spoon level, another gauges the spoon as full when it is not entirely filled. Even more uncertain and unreliable is the measurement of the fractions of the teaspoonful that are not infrequently prescribed for children. Although it is very generally conceded that the metal spoon of the household use is too uncertain and unreliable for the administration of medicine it, nevertheless, even at the present time, is the most commonly employed measure for this purpose.

To overcome the unreliability of the spoons, the glass manufacturers have placed upon the market medicine glasses and medicine goblets, of various shapes and sizes, marked for the measurement of teaspoonfuls, dessertspoonfuls, tablespoonfuls, etc. Unfortunately, the shapes selected have not been such as would permit of accurate measurement and in some cases the graduation has been very careless and inaccurate and the common medicine glass shows very little if any advantage in accuracy over the variable spoon. It is apparent that 60 minims of a liquid distributed over the bottom of a broad tumbler or goblet shaped vessel, will make so little showing that it will be difficult to gauge and to properly graduate this, and it will be impracticable to indicate lesser amounts.

The commonly employed medicine dropper for measuring medicines directed to be given in doses of so many minims or drops is likewise far from accurate. This can be readily demonstrated by measuring accurately the same number of drops of the same liquid as dropped by a number of these.

The physician has in mind a definite amount of liquid as the equivalent of the dosage term he uses. It is almost an invariable rule, that to him a drop is one minim, a teaspoonful is one fluidrachm, a dessertspoonful is two fluidrachms, a tablespoonful is four fluidrachms or a half fluidounce. Upon these equivalents he bases his calculations for the intended doses of the medicaments in his prescriptions. Practically all of the formulas in use by physicians and published in the works on medicine and the treatment of diseases, are based upon these commonly accepted equivalents, and these have also been generally employed in the "ready-made medicines" so frequently dispensed.

The United States Pharmacopœia IX recognized the seriousness of the prevailing inaccuracy in the administration of liquid medicines and while not adopting the suggestion that a standard form for a dosage measure should be defined, the Committee of Revision compromised by making in the "Introductory Notices" the following statement on page li.

"APPROXIMATE MEASURES.

"Physicians have hitherto very commonly prescribed liquid medicines in teaspoonful, dessertspoonful or tablespoonful doses. Inasmuch as spoons vary greatly in capacity, and from their form are unfit for use in the dosage of medicines, it is desirable that the

more scientific practice should be always adopted; of prescribing doses in mils, fluidrachms or minims, to be measured with a suitable medicine measure. The following are the values conventionally attached to the several approximate measures above mentioned:

"METRIC.

A teaspoonful = 4 mils.
A dessertspoonful = 8 mils.
A tablespoonful = 15 mils.

"APOTHECARIES' SYSTEM.

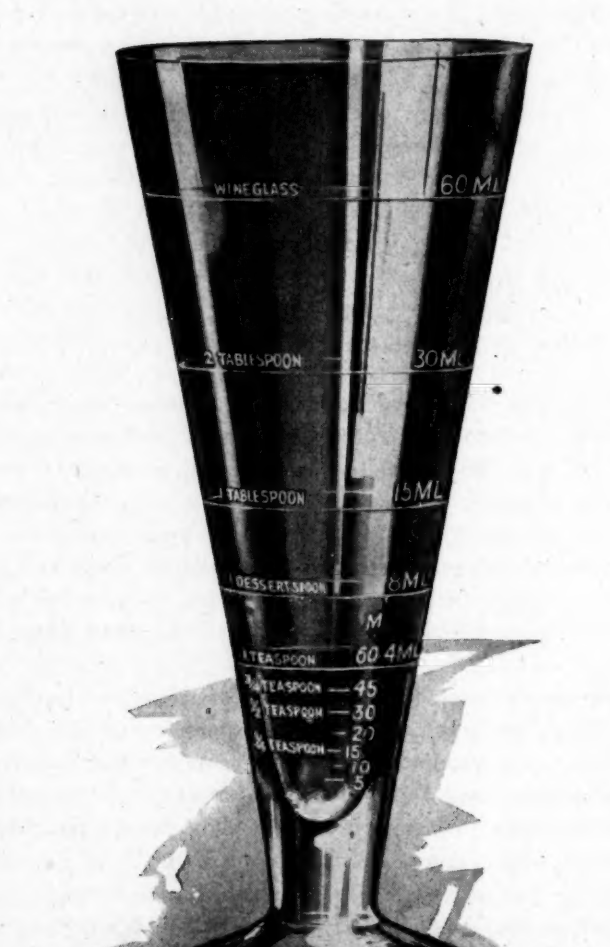
A teaspoonful = 1 fluidrachm.
A dessertspoonful = 2 fluidrachms.
A tablespoonful = ½ fluidounce."

The use of the equivalents as stated in the Pharmacopœia has given entire satisfaction and their general acceptance indicates such a firm establishment that they should be permanently continued.

Doubtless if the Pharmacopœia had gone one step further and described "a suitable medicine measure," the manufacturers of such wares would have adopted this as a standard and the uncertainty of the dosage of liquid medicines and the use of the unreliable spoons and medicine glasses, before this time, would have been largely curtailed.

The necessity for standardizing the measure as well as the equivalents of the doses in order that the uncertainty of the dosage of medicines may be terminated, is thus presented. It is not creditable to the medical profession and to the intelligence of this generation that the inaccuracy of the administration of liquid medicines has existed for so long a time and still less so that it be permitted to continue. The purpose of this communication is to present a study of this necessity that has led the writer to design a Standard Dosage Measure.

What are the essentials for such a measure? The *doses* that are commonly prescribed and which must necessarily be shown on the measure claim first consideration. Experience advises that these are certain numbers of standard drops or minims, such as 5, 10, 15, 20, 30; the teaspoonful, and at times fractions thereof, such as one-fourth, one-half; the dessertspoonful; the tablespoonful and occasionally the wineglassful. These with their metric equivalents it was concluded should be indicated upon the measure.



STANDARD DOSAGE MEASURE GLASS.

The *shape* must be such as will permit of the smallest of these named doses, 5 minims, occupying an appreciable space in the measure and also such that each of the doses named as necessary may be accurately measured and graduated. It must also be sightly and convenient to drink and to pour from. The inverted cone is the only shape that possesses all of these qualifications and so this form was adopted.

The *graduation* must be clear and accurate and indicate by distinct lines and lettering each denomination.

Stability is another essential so that the measure will not be easily upset. A relatively, broad, flat, round base was decided upon with a short heavy stem just above and the weight of glass at this point adds materially to this important feature.

The glass designed, as a result of this study, as the standard dosage measure is shown in actual size in the accompanying illustration and a sample is exhibited. It will be noted that it contains distinct graduations for 5, 10, 15, 20, 30, 45, 60 minims; the teaspoonful, and the one-quarter, one-half and three-quarter fractions thereof; the dessertspoonful; the tablespoonful; and the wineglassful along with their equivalents in mils. The denominations are arranged in three distinct columns under proper classifications. Each graduation is distinct and each dose, even down to the smallest indicated, 5 minims, can be accurately measured.

SECRET—PRIVATE—PERSONAL.

No. III.—Personal.[1]

By John Uri Lloyd, Phar.M.,

Cincinnati, Ohio.

"*Personal.* Of, or pertaining to a particular person; relating to, or affecting, an individual, or each of many individuals; peculiar or proper to private concerns; not public or general; as, *personal* comfort; *personal* desire."—*Webster.*

Wherever one turns eye or thought, comes to view a thing newly perceived or a thing recollected, to remind of something else. The leaf of this tree, the flower of that shrub, speaks relationship with

[1] For the prior papers of this series see American Journal of Pharmacy, April and June issues.

others. The fragrance of this aromatic gum or resin reminds of another; the juice of this cane reminds of other sweets; the chewed leaf of acetocella, of other sours; a sliver of gentian brings to thought other bitters; the smoke of smouldering cascarilla reminds of musk. Indeed, a single substance may play a double part, as thought turns first to one substance and then to another. Close your eyes, warm the blossom of the sweet shrub in your hand, think of *strawberries,* then bring the blossom to your nostrils, the aroma of strawberries comes also. Think now of pineapples—behold, the same unweighable emanation from the same blossom, impresses the senses with the likeness of the delicious *pineapple.* The taste of dulcamara is first bitter, then comes the sweet after-taste—hence the well-applied name, "bitter sweet."

Personal is each thing that is—and yet, no two leaves are exactly the same in contour, edge and thickness, no two odors are precisely alike, separated is each from the other, by some distinction, slight though it be. Although nature leans on the one-ness of the family relationships, inherent in its several parts, there are yet shadings bespeaking individual distinction. To level the whole by destroying the personality of each fragment in this mighty maze, would be untenable, unthinkable.

Akin to the modest violet, clinging close to the earth in the woodland's shadows, is the mighty hickory that, far separated by structure and nature, rears its head aloft and basks in the sunshine above its fellows of the primeval forest, looking down even upon the top of its sturdy oak companion. A cloak of bark has each trunk—that of the hickory shell-like, that of the oak deep-furrowed—the violet nestles perhaps in a crevice of the root bark.

Who would seek to endow the snow-white lily of the valley with the glory of the wild rose, or, because the lily, compared, for its beauty, with the splendor of Solomon, is white, would one take from the rose the blush of red that crowns its thorny stem? Who would drive from the dove its gentle personality, or make of the eagle a trembling nonentity? Wherever in air, liquid or earth man turns the critical eye, come family relationships, as well as individual distinctions, that teach him inclined to reason from the lesson nature spreads before him, that this mighty maze is not a disjointed medley, but a systematic whole, in which the greatest lessons, of strength, usefulness or beauty, may come from a study of the closest shadings that tend to personality.

Turn thought now to man, whose complicated accomplishments are cosmopolitan in the extreme. Restrict it to those concerned in the various sections of pharmacy. Should they be denied the right of personality? Instead, is not the field of him involved therein so great, in its recesses of observation, as well as research opportunities, that all-important to the world at large is *personality?* Is there not room for each individual to stand distinct as contrasted with others in his vocation? Does not the very acme of pharmacy's opportunity and service to humanity, as a whole, depend on the *quality* distinctions of her votaries?

Back, five decades and over, turns the thought of this writer, to where, in the commencement of his studies, behind the prescription counter, fifteen years successively, he stood a "druggist's clerk," aiming to qualify himself, as far as possible, in the art of pharmacy. To have suppressed the *personal* ego so earnestly encouraged by his preceptors, would surely have been to blast life's opportunity. And yet, it is plainly apparent that artificial, medico-pharmaceutical ethics of that period, indiscriminately illogical, were persistently endeavoring to suppress the individuality of pharmacists who, by studious effort leading to personal business opportunity, were seeking future professional recognition.

Who of that period cannot recall the "codists'" blanket efforts to prevent physicians from a right to direct a patient to a pharmacist possessing exceptional qualifications, in perhaps one phase of the art needed in a special compound? Who of those times cannot recall, not by innuendoes alone, but by open charges that *royalties* were paid physicians by the pharmacists who, by earned distinction, had the right to professional favors? Who of that period cannot bring to mind reflections cast on both the physician and the pharmacist, when a physician directed that a prescription be taken to a certain pharmacist whom the physician knew to have become qualified in some phase of the art, by experience as well as by special research?[2]

May we not individualize by citing a few examples from times gone by?

[2] That royalties were paid by some pharmacists to some physicians is not denied by this writer, who asserts, however, that such processes were never practiced by men classing with his preceptors or physicians favoring them with distinctive patronage.

Prof. A. Fennel made himself a reputation, as a pharmacist, second to none anywhere. One of the specialties worked out by him for Dr. Williams, the famous leader of American eye specialists, was *brown citrine ointment.*[3] Dr. Williams knew from experience that, as made by Prof. Fennel, the substance, which for use in the eye needs be unquestioned, was exactly as it should be. And yet, were not innuendoes cast at those two conspicuous leaders in their respective professions? *The ethics* of the *levelers down* were being broken by this "partiality." Everyone knew that no risk was run when the label of the talented pharmacist, A. Fennel, was on that jar.[4]

Prof. Wm. B. Chapman, a pharmaceutical educator, experimented (1864–1865), in his modest little apothecary shop, until his pin-dipped gelatin capsules, pioneers at that date, attained a well-earned professional reputation, Cincinnati over. And yet, scarcely did a physician dare to specify "Chapman" on a prescription. At that date suppositories were made by pouring medicated cocoa butter into paper cones, each resting in the mouth of a wide-mouth vial. Chapman devised a metal mould, two sizes, one capable of making twelve, the other six suppositories. He experimented with excipients until he determined not only that an addition of ten per cent. of Japan wax improved the cocoa butter, but that different proportions were desirable with different drug admixtures. A great study did he make of suppository problems and distinction necessities.

Here, too, prevailing *ethics* tended to crush the personality of him who *knew* in pharmacy, by right of discovery and of persistent thought and experimentation, care and effort. Wrong was it for any but the most independent physician to give personal recognition to this man's distinctive qualification, in this specialty he had developed. Standing head and shoulders above all others in this field, for Chapman to have *advertised* either his gelatin capsules or his *suppositories* made by means of a mould he had devised, would have been to damn him ethically. In the case of this exemplary

[3] In this cod liver oil replaced neats-foot oil (U. S. P. 1850), then official in citrine ointment.

[4] Indeed, that fair-minded pharmacists recognized the justice of the case is evident, because "Gordon," with whom this writer was an apprentice, purchased the preparation from "Fennel," in order that Dr. Williams might have no reason for complaint.

man, such misapplied ethics, applied to the limit, kept him ever in commercial shadows, losing to him finally his loved pharmacy. Came the thought to this writer, in a final visit to Prof. Chapman's humble home, where lay this man of science, breathing his last—"If regularity in ethics brings to such as he neither personal opportunity, professional distinction, nor well-earned home comforts, such ethics is a misnomer. Better to live afar from the Code, contribute to humanity as an individual privileged to give or not, as seems proper, and die an *irregular*."[5]

Probably each reader of these lines engaged in prescription pharmacy half a century ago, in any American city, can testify to incidents paralleling such as this, incidents bespeaking the wrong resulting from a misapplied code aiming to *elevate* the many, at the expense of the few.

And what of the present? Let those concerned therein speak. They can answer the question as to how recognition is now given him who, in enthusiasm, devoted years to the study of the pharmacist's art, as contrasted with him who came into it for business only, from the outside, who never filled a prescription, never attended a college of pharmacy or served an apprenticeship, and yet blazes his name as pharmacist, close to his "cut rate" sign, and as the law permits, engages a "clerk."[6]

A Plea for Justice.—Is this writer alone, all alone, in asking that balanced thought be given the shortcomings of this great *ethical* problem that, founded on past altruistic ideals necessitated by deplorable abuses, stares the faces of those who to-day enter this field to study, work, sacrifice, in humanity's behalf? Is it possible that the young man who seeks to qualify himself above the multitude indifferent either to true ethics or earned service, seeking the opportunities given by our colleges of pharmacy, will forever be denied the *personal* recognition earned thereby? Is he forever to compete with commercial tradesmen—forever to be denied *personal* recognition, even by the profession of medicine? Is he, after his well-

[5] By right of experience do I write. After Dr. Chapman failed in business, for two years he was "head clerk" of Mr. Gordon's pharmacy. Under him an apprentice needed no incentive to master his art,—Dr. Chapman was an enthusiast, even in his misfortunes.

[6] Too well this writer appreciates that "cut rate" signs are not a monopoly of the pseudo-pharmacist. Nor are extravagant newspaper advertisements restricted to untaught physicians.

earned diploma is handed him, then to discover that his *personality* is to be suppressed, under the misapplied argument that one pharmacist is the equal of another—that he cannot assert his personal right to manipulative superiority? That all he evolves must be open to others—that he must needs, perhaps, give a gold mine to his advertising competitor, or a moneyed man's business investment? Is he forever to be governed by either a written or an unwritten code of laws that, formulated by men who make their living otherwise, has never harmonized, and never can harmonize, either with rules of business, precepts of law, or with commercial processes that govern the methods of men, the world over? Are the teachers in our colleges of pharmacy not to be encouraged in their great sacrifices, so that they may in some way reasonably assure their graduates that merited recognition will be given well-earned *personality,* whether they create a something new, or make a serviceable discovery touching medicines?

SUMMARY.—Take now the three words—*Secret, Private* and *Personal.* Draw better than this writer, if one can, a sharp distinction between each, as contrasted with the others. With these words, all differentiating shades of expression run into each other; with all, good or bad ethics may result, if respective definitions be inflexibly applied thereto.

May not this series of studies, based on a life-time spent in pharmacy, be considered as an attempt (very superficial) to do no more than lead modern thought in some way, to consider the possibility of giving both ethical credit and substantial return to the qualified pharmacist to whom such is due? That is, if any code other than a personal acceptance of "THE GOLDEN RULE," is really essential to life and action, either of persons engaged in the profession of medicine, or those concerned in the art of pharmacy.

ON THE STABILITY OF DIGITALIS LEAF EXTRACTS. (FIRST PAPER.)

By James M. Schmidt and Frederick W. Heyl,

KALAMAZOO, MICH.

Chemists have not yet succeeded in agreeing upon the chemistry of digitalis leaves and it is very probable that the question will remain unsolved until the fullest pharmacological assistance is brought into closest coöperation. A chemist in proceeding with work upon a lot of digitalis leaves ought to be informed upon the activity of the drug and of various extracts such as the water-soluble and water-insoluble parts; of the ether extract and of the chloroform extract of the water-soluble part. Before proceeding with the study of any one of these four fractions he ought to have a precise idea of what the relative toxicity of the fraction is, and also whether the fraction retains it without deterioration during the study thereof. Furthermore, he ought to be able to repeat the first extractions and purifications and arrive at definite crude fractions uniformly. The most significant advances might be made if the efforts of chemists were placed upon the production of the crude fractions of somewhat constant composition rather than upon the study of refined products of crude material which they either did not prepare themselves, or which they have not in the first place prepared repeatedly with some degree of uniformity.

Of the crude fractions which offer some hope of positive results we have above all the ether and chloroform extracts of the water extract. The water extract, however, has been prepared by different methods, and consequently the constituents of these extracts (with the possible exception of digitoxin) cannot be said to be understood.

Schmiedeberg[1] first described a substance designated as "digitoxin." The leaves were extracted with 50 per cent. alcohol, after a preliminary water extraction. The alcoholic extracts were clarified with lead acetate, filtered, and the filtrate freed from the excess of Pb with ammonia. After again filtering, the fluid was concentrated to remove alcohol. When the alcohol had been removed, a precipitate separated consisting of "digitoxin and fat, etc." This was washed with dilute soda solution, with water and dried. The dried residue thus obtained was extracted with chloroform.

[1] *Arch. f. Path. u. Pharm.*, 3, 16 (1874).

The chloroform was recovered and the residue digested with ether and petroleum ether. The insoluble crude digitoxin is recrystallized from 80 per cent. alcohol, from which it separated in fine needles or leaflets as a crystal powder, melting at about 240°. C = 63.6; H = 8.5. It is insoluble in water, benzin, ether, cold alcohol, but more readily in hot alcohol, and very soluble in chloroform.

Kiliani[2] took up the work twenty-one years later. He followed Schmiedeberg closely as to extraction. He extracted first with water to which 5 per cent. alcohol had been added. The water extract was shaken with ether and the deep green extracts were shaken with dilute soda solution. As he now concentrated the ether solution, crusts separated, which were filtered off and washed with ether. The yield was 0.015 per cent. It was considered digitoxin but as it did not agree entirely with Schmiedeberg's it is designated as β digitoxin.

The same substance was isolated in larger quantity (0.085 per cent.) by extracting with 50 per cent. alcohol after first removing the water extract. The 50 per cent. alcoholic extract was precipitated with lead subacetate and filtered. Alcohol was recovered from the filtrate which was then exhausted with ether. The ether extract was washed with water. When concentrated, more "β digitoxin" separated in crusts. This material was crystallized from 5–10 parts of boiling 85 per cent. alcohol, whereupon wartlike aggregates of leaflike crystals separated, melting at 145–150° and containing water of crystallization. When dissolved in methyl alcohol + chloroform (1 : 1) and crystallized by the addition of ether it separates in small prisms, water-free and decomposing above 240°.

Concerning the identity of β digitoxin with Schmiedeberg's preparation as well as with the product of Merck, Kiliani finally concluded[3] that these products were identical, and possessed the formula $C_{34}H_{54}O_{11}$[4] C = 63.9; H = 8.5. The experimental work recorded is not conclusive in our opinion.

Kiliani in this work first hydrolyzed his β digitoxin with dilute hydrochloric acid and separated digitoxigenin. This body crystallizes from boiling 95 per cent. alcohol upon the addition of water in large prisms and does not melt at 220°. (Sinters at 225–230°.) This substance to which the formula $C_{21}H_{32}O_4$ was first assigned is now corrected to $C_{23}H_{32}O_4$. The sugar split from digitoxin is digitoxose, $C_6H_{12}O_4$, m.p. 101°, $(a_d) = +46°$. It is an interesting methyltetrose sugar. The presence of this sugar group causes the characteristic color test for digitoxin, *i.e.*, with H_2SO_4 containing a trace of iron sulphate, a wine red coloration results. In hydrochloric acid a yellow color changing to green is obtained. Dissolved in acetic acid containing iron sulphate plus sulphuric acid containing iron, an indigo blue is obtained.

Although there was thus some agreement on this substance as an ether or chloroform extractable product, Kraft[5] has rather failed to confirm these views. Kraft extracted with cold water clarified with lead acetate and

[2] *Arch. d. Pharm.*, 233, 311 (1895).
[3] *Arch. d. Pharm.*, 234, 273 (1896).
[4] B. 31, 2454 (1898).
[5] *Arch. Pharm.*, 250, 118 (1912).

sodium phosphate, and precipitated all the products in the water extracts with tannin. From this he liberated the glucosides in the usual manner with ZnO. These were taken up as far as possible in water and the water solution was extracted with chloroform. The activity was in the chloroform extract while the water soluble substances which greatly predominated (5 per cent.) are saponins, which upon hydrolysis yield glucose and a pentose. Interest therefore centers in the chloroform extract, but at this point Kraft dropped the work and instead shook out fresh aqueous extracts with chloroform omitting the tannin procedure. From this chloroform extract he precipitated with ligroin a substance termed by him "gitalin" but which appears to be a mixture.[6] The yield is 0.7 per cent.

Now Kiliani[7] had stated that the digitalis leaf extracts which had been ether-extracted would yield when subsequently chloroform-extracted a second active substance, not digitoxin but "digitophyllin." Later[8] in reviewing digitalis chemistry he omits this substance from consideration.

Kraft continued his work by extracting the water-extracted leaves with 50 per cent. alcohol. This extract was clarified with lead acetate filtered and concentrated to a small volume in the presence of calcium carbonate. A heavy precipitate separated as with Schmiedeberg. The precipitate is washed with 2 per cent. soda solution and dried, and the dried precipitate is exhausted with chloroform, which dissolved a glucoside agreeing, but not conclusively, with digitoxin.

After exhausting the dry precipitate with chloroform Kraft boiled the residue with alcohol, and a glucoside, "gitin" yielding galactose on hydrolysis was isolated C = 52.2; H = 8.1.

It therefore appears that the chloroform soluble glucoside present in water solutions and in 50 per cent. alcoholic extracts is not definitely known, but there is a certain quite reasonable hypothesis that there is a chloroform soluble glucoside, yielding digitoxose on hydrolysis, and which is insoluble in water when once it has been separated to a certain degree of purity. To this substance the term digitoxin applies. What the composition of "gitalin" is has not been studied further except that when one purifies it further a part becomes insoluble in chloroform, ether and water. Merck[9] has found in producing digitoxin that a part of the glucoside originally taken out by means of chloroform becomes insoluble. Kraft designates his insoluble product "anhydrogitalin," a digitoxose glucoside and it appears to be a pure product.

On the whole the chemistry of these substances is in an unsatisfactory condition. When the leaves have been exhausted with

[6] Kiliani, *Arch. Pharm.*, 252, 13 (1914).
[7] *Arch d. Pharm.*, 235, 425 (1897).
[8] Am. J. Pharm., 85, 223 (1913).
[9] B. 48, 334 (1915).

water and when this extract has been exhausted with ether and chloroform, a very considerable part of the glucosides remain soluble in water and not in chloroform or ether. Here is a part of the subject even less understood.

Keller[10] attempted to duplicate Kiliani's work on a small scale (20 Gm.) and obtain a quantitative estimation of "digitoxin" and thus arrive at a conclusion concerning the activity of the sample. The leaves were extracted with 70 per cent. alcohol, percolate concentrated, precipitated with lead acetate, filtered, and excess of lead removed with sodium sulphate. The clear fluid is rendered ammoniacal and extracted with chloroform. These extracts are concentrated, redissolved in 3 Cc. chloroform and precipitated with an ether + ligroin mixture. This precipitate is weighed and calculated as digitoxin. Yield 0.26–0.62 per cent.

To illustrate the futile nature of Keller's assay we give an experiment wherein the activity of the "crude digitoxin" amounted to only 12 per cent. of that of the drug.

A tincture of digitalis U.S.P. (D-1625) was assayed by the one-hour frog method. Found M.S.D. = 0.0052 Cc.

Assayed by Keller's process the total crude chloroform extract (12 Gm. drug) weighed 73.1 Mg. = 0.6 per cent. Redissolved and precipitated with ether + ligroin the "crude digitoxin" weighed 48.4 Mg. (0.4 per cent.).

This was dissolved in 200 Cc., 70 per cent. alcohol. Forty Cc. (2.4 Gm. drug), was concentrated on the steam bath to remove alcohol, and then made up to 20 Cc. with physiological salt solution. (Solution = % × tincture strength.) M.S.D. = 0.0366 Cc.[11] The proportionate toxicity of Keller's "crude digitoxin" is therefore about 12 per cent. of the total of this drug.

We did not carry this work any further, as it has already been shown by Barger and Shaw[12] that the digitoxin isolated in Keller's process represents from 29 per cent. to 14.5 per cent. of the activity of the drug. This has also been established by Focke and others, and the proof is established that the chemical process above described is entirely useless.

The interest in Keller's work, however, accentuates the value of pharmacological work to chemical investigation. It is evident that a large part of the active substance or substances are either (*a*) lost in the resinous precipitate and lead acetate precipitate or (*b*) con-

[10] *B. d. d. Pharm.*, G. 7, 125 (1897).

[11] Equivalent to 0.018 Mg. p. Gram frog Keller's "digitoxin" *i.e.*, 0.5 Mg. for 30 G. frog.

[12] *Pharm. J.*, 73, 259 (1904).

tained in the aqueous liquor from which the "digitoxin" has been extracted with immiscible solvents.

Keller was the first to point out that he could obtain heavy precipitates in the extracted fluid with tannic acid after having exhausted the ammoniacal liquor with chloroform. It is now well understood that the leaves contain a water soluble glucoside or mixture of glucosides, and while it is not known how far the precipitation of resin removes activity it is suspected that a greater proportion of the activity of the leaf is water soluble and not found in the "digitoxin" shake out. This hypothetical substance is known as "digitalein."

Kilaini[13] and Windaus have made some observations on this point.

They prepared an infusion (15 minutes) which was concentrated with some loss of activity to a syrup. This was diluted with strong alcohol and the precipitate filtered off. The concentrated filtrate was dissolved in water and precipitated with tannic acid. The precipitated tannates were decomposed with zinc oxide and the liberated glucosides were dissolved in alcohol (4 parts). To this two parts of ether were added, and an active precipitate obtained (2 Mg.). It weighed 16 Gm. from 10 Kg. and was water soluble. To the main alcohol + ether solution, a further addition of ether (4 parts) gave a second precipitate which was water soluble and active (1 Mg.). The final solution from the ether precipitations contained 20 Gm. of which 2 Gm. was water soluble and toxic.

Kiliani then took the leaves which had already been used to prepare the infusion and extracted them with alcohol. The alcohol was distilled off, and the residue taken up with absolute alcohol and filtered. The alcohol was again removed from the filtrate and the residue taken up in water, and filtered from resin. This aqueous solution was extracted with ether and with chloroform. The water soluble part (1.5 per cent.) was very active (1.5 Mg.). The solution was saturated with magnesium sulphate and an active substance (0.6 Mg.) precipitated.

While the above work is chemically indefinite it is necessary to understand that it is from this work that the term "digitalein" is derived and that it means the water soluble active principle or principles of the leaf.

The work of Kraft also has a bearing on the water soluble constituents. Kraft it will be recalled first extracted the drug with *cold* water, and then after clarifying with lead and sodium phosphate, precipitated glucosides with tannin. This precipitate contained chloroform soluble material which was removed by extraction and also water soluble material which Kraft named digitalis leaf "saponin." Contrary to Kiliani's work on the infusion where an active "digitalein" was found, Kraft found his water soluble material

[13] *Arch. Pharm.*, 237, 464 (1899).

inactive. Kraft hydrolysed this saponin and detected by their osazones, glucose and arabinose (or xylose).

Kraft then reëxtracted his leaf with 50 per cent. alcohol and on removing the digitoxin as above described found that a hot alcohol extraction subsequent to the chloroform extract yielded "gitin" a crystalline galactoside, insoluble in water and in chloroform, melting at 260–265°. It crystallizes in needles and contains 11.5 per cent. water of crystallization.

The experimental work reviewed agrees in that a 50 per cent. alcoholic extract is found to yield more active extracts than a preliminary water extract. For example, Kiliani and Windaus made an infusion (10 Kg. leaf), from which 190 Gm. of tannate was precipitated, while a subsequent 50 per cent. alcohol extraction yielded after removing certain fractions with absolute alcohol, chloroform and ether, 150 Gm. of very active water soluble material containing "digitalein." This matter is very puzzling in view of the fact that we consider a fresh 10 per cent. infusion as practically equivalent to a 10 per cent. tincture when examined by the one-hour frog method. Work on this point, and on the rate of deterioration of infusions is in progress in this laboratory. Focke[14] states that the water extracts about 80 per cent. of the activity. Concerning the rate of deterioration of the infusion, results are very contradictory.

Several recent observations[15] have indicated that alcoholic extracts are not stable. This finding is of the utmost importance in therapy, and a clearer understanding of these values is important with reference to the chemical investigation of digitalis leaf. One of the most interesting points in this connection would be to observe whether or not these solutions finally arrived at a permanent equilibrium as to toxicity, and to observe what part of the toxicity was thus found to be stable. A chemical study of a digitalis extract aged in this manner would certainly be a more hopeful one to begin with. Is, for example, the permanent toxicity of an aged tincture the water-soluble fraction or is it the "digitoxin"? Or do we have a mixture of cleavage products? A series of examinations on samples of alcoholic extracts which we report below prove that a condition of greater stability is obtained on aging. These results are discussed in the summary at the end of this paper.

[14] *Arch. Pharm.*, 249, 323 (1911).

[15] Roth, *Bull. Hygienic Lab.*, 102 (1916); Pittenger & Mulford, J. Am. Pharm. A., 7, 236 (1918).

Experimental.

A. Tincture 1. No. 35337 (D-1625) 2–15–17. A standard U. S. P. tincture, alcohol = 64 per cent.

Date.	M. S. D., Mils.	Toxicity, Per Cent.	Period in Months.
Mar. 2, 1917	0.0061	100	
Apr. 20, 1918	0.0108	55	13
Jul. 20, 1918	0.0107	55	16
Aug. 17, 1918	0.0125	48	17
Sep. 1, 1918	0.0140	42	18
Oct. 12, 1918	0.0162	37.5	19
Nov. 3, 1918	0.0150	40	20
Dec. 1, 1918	0.0162	37.5	21

Tincture 2. No. 36498 (D-1625) 6–13–17. Alcohol = 64 per cent. Assayed as follows:

Date.	M. S. D., Mils.	Toxicity, Per Cent.	Period in Months.
June 19, 1917	0.0060	100.0	
July 21, 1918	0.0120	50.0	13
Aug. 17, 1918	0.0150	40.0	14
Sept. 15, 1918	0.0160	37.5	15
Oct. 13, 1918	0.0160	37.5	16
Dec. 23, 1918	0.0160	37.5	18
April 1, 1919	0.0160	37.5	22

Tincture 3. Fat free. No. 37798 (D-1625) 1–10–18. Alcohol = 46 per cent.

Date.	M. S. D., Mils.	Toxicity, Per Cent.	Period in Months.
Jan. 12, 1918	0.0060	100.0	
July 27, 1918	0.0093	64.0	6
Aug. 31, 1918	0.0120	50.0	7
Sept. 28, 1918	0.0150	40.0	8
Oct. 20, 1918	0.0160	37.5	9
Nov. 17, 1918	0.0160	37.5	10

Tincture 4. No. 38182 (D-1625 + D-460) 1–31–18. Alcohol = 64 per cent. This tincture when first prepared showed a strength of 170 per cent. which was reduced to 110 per cent. by dilution.

Date.	M. S. D., Mils.	Toxicity, Per Cent.	Period in Months.
Feb. 9, 1918	0.0055	110.0	
July 27, 1918	0.010	60.0	5
Aug. 31, 1918	0.011	54.0	6
Sept. 26, 1918	0.0141	42 5	7
Oct. 20, 1918	0.0141	42.5	8
Nov. 17, 1918	0.0141	42.5	9
April 1, 1919	0.0141	42.5	14

Tincture 5. No. 39220 (D-1625) 6–21–18. Alcohol 64 per cent.

Date.	M. S. D., Mils.	Toxicity, Per Cent.	Period in Months.
June 29, 1918	0.0066	90	
July 27, 1918	0.0071	84	1
Aug. 31, 1918	0.00769	78.0	2
Sept. 28, 1918	0.00774	77.5	3
Oct. 20, 1918	0.00827	72.5	4
Nov. 17, 1918	0.00827	72.5	5
Feb. 23, 1919	0.00857	70.0	8

From these results we may plot the rate of deterioration for tinctures as recorded by the one-hour frog method as follows:

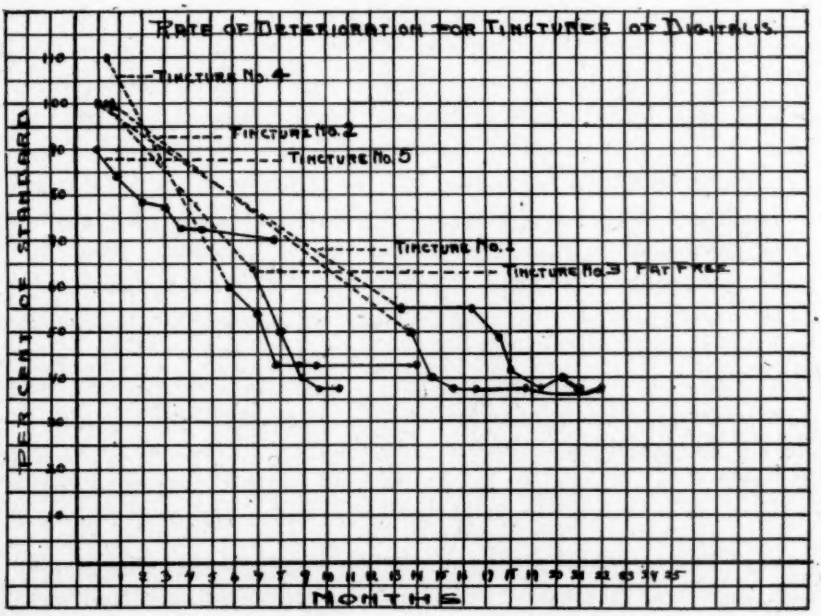


FIG. I.

B. Fluidextract 1. No. 36113 (D-1625) 5–10–17. Alcohol 75 per cent.

Date.	M. S. D., Mils.	Toxicity, Per Cent.	Period in Months.
May 11, 1917	0.000476	128	
Aug. 3, 1918	0.001153	52	15
Sept. 5, 1918	0.001260	47.5	16
Oct. 13, 1918	0.001260	47.5	17
Dec. 15, 1918	0.001260	47.5	19
Apr. 1, 1919	0.001333	45.	23

Fluidextract 2. No. 36113 (D-1625) as marketed, the preceding sample being diluted. Alcohol 75 per cent.

Date.	M. S. D., Mils.	Toxicity, Per Cent.	Period in Months
May 12, 1917	0.00060	100	
July 20, 1918	0.00143	42	14
Sept. 15, 1918	0.00160	37.5	16
Nov. 3, 1918	0.00150	40	18
Mar. 24, 1919	0.00150	40	22

Fluidextract 3. No. 37799 (D-1625)—the undiluted fluidextract before dilution for market. Fat free, about 50 per cent. alcohol.

Date.	M. S. D., Mils.	Toxicity, Per Cent.	Period in Months.
Jan. 12, 1918	0.000530	113	
July 14, 1918	0.000660	91	6
Aug. 6, 1918	0.000807	74	7
Sept. 5, 1918	0.001000	60	8
Oct. 13, 1918	0.001043	57.5	9
Oct. 27, 1918	0.001090	55	10
Jan. 19, 1919	0.001090	55	12

Fluidextract 4. No. 38459 (D-1625) as submitted for assay before final concentration.

Date.	M. S. D., Mils.	Toxicity, Per Cent.	Period in Months
April 9, 1918	0.000785	76	
July 13, 1918	0.000866	70	3
Aug. 10, 1918	0.000900	66	4
Sept. 8, 1918	0.001090	55	5
Oct. 12, 1918	0.001090	55	6
Oct. 27, 1918	0.001090	55	7
Jan. 5, 1919	0.001090	55	10
April 1, 1919	0.001142	52.5	12

The results are plotted upon the following chart:

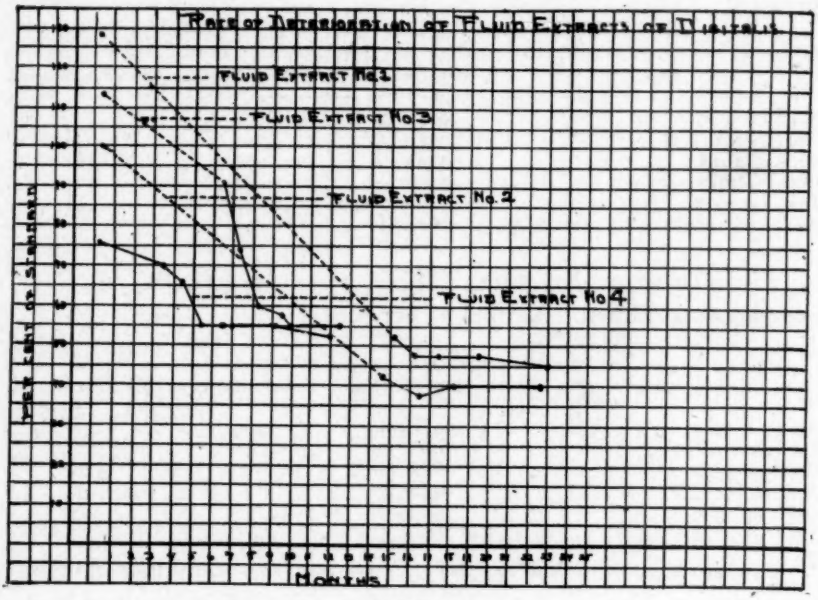

Rate of Deterioration of Fluid Extracts of Digitalis
Fluid Extract No. 1
Fluid Extract No. 3
Fluid Extract No. 2
Fluid Extract No. 4
Per Cent of Standard
Months

FIG. 11.

C. Stability of Dry Leaves.—From these results given for tinctures and fluid extracts, the permanency of the drug as compared to the extracts may be plotted. Reviewing the above data with this in view we find that Drug D-1625 showed the following values:

Date.	Material Analyzed.	Drug Strength, Per Cent.	Age in Months.
Dec. 5, 1916	(sample)	120	?
Feb. 15, 1917	20 gal. Tinct.	150	
Mar. 1, 1917	20 gal. Tinct. F. F.	136	
June 13, 1917	20 gal. Tinct.	130	6 (in stock)
Jan. 12, 1918	40 gal. Tinct. F. F.	100–113	13 " "
June 29, 1918	20 gal. Tinct.	90	19 " "
Sept. 4, 1918	40 gal. Tinct. F. F.	60	22 " "

Comparing the strength of fluid extracts prepared during the same period and from the same drug we have about the same curve.

Date.	Flex. No.	Drug Strength, Per Cent.	Age in Months.
May 10, 1917	36113	128	5
Jan. 12, 1918	27799	113	13
Apr. 9, 1918	38459	76	16
Apr. 1, 1919	sample of drug	50	28

The curves are plotted as follows:

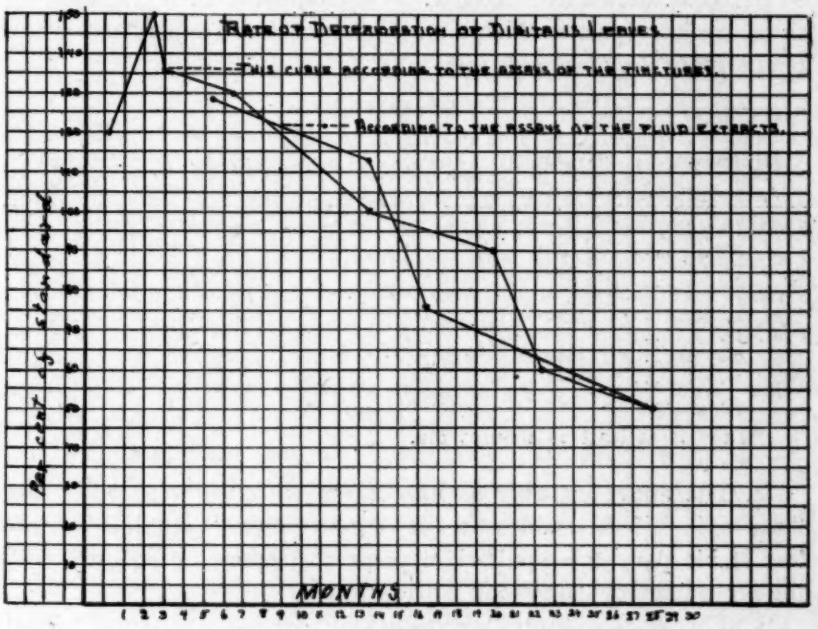

Rate of Deterioration of Digitalis Leaves
This curve according to the assay of the tinctures.
According to the assay of the fluid extracts.
Per cent of standard
MONTHS

FIG. III.

SUMMARY.

1. Alcoholic extracts of digitalis leaves, as well as the leaves themselves, gradually lose part of their activity; the losses in the extracts from young drug were irregular and the velocity of this reaction in alcoholic solution was much greater than in the drug itself.

2. An equilibrium of somewhat marked stability results, indicating that the leaf contains a constituent much more stable than a second active but unstable constituent which is also present.

3. In the leaf studied the more stable component represents less than half the total activity of the young dried leaf (40 per cent.). The results obtained on extracts made from older drug indicate (but not conclusively) that the drug, having lost more or less of the unstable active component, yields an extract which naturally comes to equilibrium, at a greater activity, owing to the predominance of the more stable constituent. This is conspicuously shown in Fluidextract 4, where a rundown drug at least 16–18 months old (76 per

cent.) yielded an extract which came into equilibrium with 52/76 or 69 per cent. permanent activity. The following table summarizes the work in respect to this point, Tincture 5 being out of order and possibly not yet at equilibrium.

Sample.	Activity of Drug.	Gm. Drug in 1,000 Cc. Activity = 100.	Activity = 100.		Calculated Per Cent. Stable in 100 Per Cent. Activity.
			Per Cent. Stable.	Per Cent. Lost.	
Tinct. 1	135	74	37.5	62.5	
2	130	77	37.5	62.5	
3	100 113	100. 89	37.5	62.5	(51 (45
5	90	111	81	29	56
F. E. 1	130	770	37	63	
2	130	770	40	60	
3	113	885	49	51	45
4	76	1,320	69	31	67*

* Leaf is at least 18 months old.

4. The above conclusions may agree with the hypothesis that "digitoxin" is the stable and that the so-called "digitalein" is the less stable part, the equilibrium point corresponding roughly with the percentage of "digitoxin" often found.

5. This work indicates the futility of conclusive pharmacological work on Galenical digitalis preparations and certainly points out a very good reason for the failure of pharmacologists to agree among themselves on many points.

The authors wish to expressly indicate that the above work was carried out incidental to the commercial production of the products and that further experimental work involving temperature control, percolation on smaller scale, etc., is desirable. The results are published as they clear up somewhat the very conflicting views found in the literature and in the profession, concerning the stability of this important drug.

RESEARCH LABORATORY, THE UPJOHN COMPANY,
KALAMAZOO, MICHIGAN, May 2, 1919.

THE CULTIVATION OF AROMATIC PLANTS IN THE UNITED STATES.[1]

By P. H. Todd,

KALAMAZOO, MICH.

The lessons of the Great War have taught us, among other things, the dangers of relying on foreign resources for the important drug, dye and chemical materials on which many of our important industries depend. Happily for the perfume industry, the districts in which the production of aromatic oils is chiefly centered (southern France, northern Italy and Switzerland) remained in friendly hands and the supply of flower oils was not cut off. But though we hope that these districts, which our arms have helped to protect, will be forever free from the ravages of war, there will always seem to be a danger, while Europe remains in its present unsettled condition, that international complications may suddenly cut off the foreign and, at present, only source of supply of many of the most important perfume materials.

For this reason it is of interest to us to briefly review the extent of the volatile oil industry as at present developed in this country and to consider the possibilities of its further development with a view to our securing a fair measure of independence of the foreign sources.

The principal volatile oils produced in the United States are peppermint, spearmint, pennyroyal, wintergreen and sweet birch, sassafras, wormwood, tansy, erigeron, and the spruce, cedar and pine oils. Our production of these oils is not only sufficient for our own needs, but permits a large exportation to foreign countries. In the case of peppermint, about nine tenths of the total world's supply is produced in a few counties of southern Michigan and northern Indiana. Fifty years ago the chief source of this oil was in a few counties of England, Mitcham County among them, which gave its name to the variety most widely cultivated in this country. The development of the culture in this country has caused the perfection and adoption of more economical and efficient methods of production, so that in normal times this oil is produced much more cheaply here than in England.

[1] Address delivered at the annual convention of the Manufacturing Perfumers' Association of the United States.

A detailed discussion of the methods of producing these well-known oils will probably not be of sufficient interest to the perfume trade to justify its repetition here, the subject having been repeatedly covered in trade journals and technical books. It may be opportune, however, to mention the case of peppermint oil as an instance of the American tendency to simplify foreign methods of production when once established in an industry that was formerly confined to European countries. In England the peppermint roots or rhizomes are allowed to sprout in the spring, and when the sprouts have developed into plants two or three inches high these plants are separately set in the ground at regular intervals, thereafter being cultivated entirely by hand. In America the roots are laid in longitudinal trenches three feet apart and the cultivation is done with horses, both planting and cultivation being much cheaper this way. The English yield averages about fifteen pounds to the acre, whereas ours is usually not less than twenty-five, and often much more. When the crop is harvested, they distil theirs over boiling water, several hours being necessary for the complete distillation of one vat-full. We distil ours with live steam and a much larger vat-full requires only twenty minutes time in a modern still.

Of the oils which we secure chiefly from European sources the most important to the perfume trade seem to be lavender, rose, rosemary, geranium, neroli, orris root, and the flower odors isolated by the enfleurage or maceration processes, as jasmine, tuberose, violet, jonquil, hyacinth, etc.

The first of these, lavender, which is grown extensively in the mint-producing districts of England, has been successfully grown experimentally in Michigan where the Mitcham peppermint is so extensively grown. The only serious difficulty that presents itself is due to the frequent occurrence of heavy snows which tend to break down the bushes. Lavender is grown preferably in nicely rounded, compact bushes, and the flowers are cut off by grasping a handful of twigs at once and cutting them off together, with a sickle. Heavy snows flatten the bushes out, making the gathering of the flowers more difficult. However, this is not a prohibitive difficulty. There are localities in the Carolinas and other parts of the country where lavender could be grown with no climatic difficulty.

The distillation of rose has never been extensively undertaken in this country. In California, where the rose grows so prolifically, the atmosphere is probably too dry for a sufficient oil yield. It is

essential that the air be sufficiently humid so that there will be moderate dews during the harvesting season, as roses gathered in the morning, with a moderate dew upon them, yield a greater quantity of oil. In southern France the heat is rather too intense and the dews and rains are somewhat excessive. The production is carried on extensively there, however. In Bulgaria the conditions of soil and climate are very ideal. The mountains to the north shield the Bulgarian fields from the icy northern winds of the winter season, and the soil is largely old lake bottom of a semi-clay character, holding plenty of moisture but allowing an excess of it to pass through.

It seems improbable that the northern states can provide a suitable home for rose culture, but the ideal climatic and soil conditions can probably be approached closely south of the Mason and Dixon line and east of the Mississippi.

Rosemary oil, which is produced chiefly in Spain and along the Dalmatian coast, though it is raised quite extensively in England, but with greater difficulty, could probably be grown with excellent success in Florida. Rosemary needs a warm climate and should be grown on a dry, chalky soil, sheltered from cold northern winds.

Geranium oil is produced most successfully in the mild climate of Spain, and though it probably could not be successfully raised in the northern states, the southern states and California undoubtedly furnish favorable opportunities for its culture.

Oil of neroli, which is obtained from the flowers of the bitter orange, is distilled principally in southern France. Like geranium and rosemary, it probably could be produced with equal ease, as far as climatic and soil conditions are concerned, in the southeastern states.

Orris oil, from which irone is obtained, and which is distilled from the rhizome of the white flag, is obtained most successfully on a dry, strong soil with plenty of sun, and, with plenty of water available, the climate of California appears to be well suited to its production. The white flag has been grown there experimentally with good results.

The preparation of flower concretes and absolutes from the hyacinth, tuberose, jasmine, violet, jonquil, etc., has never been undertaken in this country on a commercial scale, though it seems very safe to say that they could be produced as well here as abroad excepting for the single element of labor. Experimental work in the

cultivation of these flowers for their essences is being conducted now by the Department of Agriculture, and also in the experimental gardens of the A. M. Todd Company at Mentha, Mich., and it is hoped the valuable information will be available from both sources within a year or two. It may be of interest to recall that in 1914 there were about 10,000 acres of hyacinths under cultivation in Holland in soils very similar to the black soils of the mint-producing districts of Michigan, these hyacinths being grown for the double purpose of extracting the perfumes, and the production of bulbs for market. Volatile solvents are used in extracting the perfume, this being the only method that has proven practicable.

To sum up the prospects for home-production of the important perfume materials, it would seem safe to say that in our vast country, with its variety of climates—hot, cool, dry and humid—and its endless variety of soils and geological formations, a suitable combination of soil and climate can be found for every perfume-bearing plant of present importance to the trade. The one single determining factor that will make successful culture of the plants possible or impossible seems to be the element of labor. The cultivation of aromatic plants entails a great amount of hand labor, and it appears that the success of the industry will chiefly depend on the relative labor cost here as compared with the cost of labor abroad, and the extent to which the greater cost here is offset by a moderate tariff, and by a liberal spirit on the part of the consumer of these materials, evidencing itself in a desire to give the preference to the home product when he finds it in competition with the foreign product; and even, if need be, in a willingness to pay a little more than the foreign price and so share a part of the burden, if, during the first few years, it is impossible, on account of abnormal labor cost or other causes, for the American producer to meet the foreign price without loss. Once this industry is fairly started, it is reasonable to believe that American genius will triumph over the difficulties that now present themselves, and that the American branch of the industry will be able to hold its own in the American market without further help from the consumer.

What seems to be rather an analogous case is the development in this country, during the last four years, of the cultivation of medicinal herbs, and especially of the important drug plants, belladonna and henbane, or hyoscyamus. Before the outbreak of the war, our requirements in the herbs were obtained entirely from cen-

tral Europe, so that the supply was abruptly and completely cut off. So dependent had we been on the foreign product that we not only were producing no herb, but had no seed. Fortunately it was possible to obtain a little of the belladonna seed from Scandinavia, and a small amount of the henbane seed had been saved at Mentha, from plants grown in the experimental garden. These seeds were planted, and very careful attention to the growing plants yielded an excellent quality of herb, though at a production cost that was several times greater than the usual market price before the war. Scientific study, however, has enabled us to rapidly cut the cost of production, in spite of the steady increase in the cost of labor, and as the American product is much superior in quality to the foreign herb, we are confident of our ability to continue permanently to meet foreign competition in this item. The success with henbane brought particular satisfaction, as it is an unusually delicate plant.

ADVERTISING.[1]

By Jacob Diner, Ph.G., M.D.,
NEW YORK.

Funk and Wagnall's Dictionary defines the word "advertise" as follows: To make known; publish abroad; commend to the public. To my mind the more important part of the above definition is to "commend to the public." For after all, the essential object of an advertisement, speaking in the commercial sense, is to sell goods or services.

Now the mere publication of one's willingness to sell, barter or trade does not carry within itself any persuasion or argument to create in the reader of the "ad" the desire to purchase from or to deal with the advertiser. There must be something to recommend this particular store, merchandise or service to the would-be purchaser in preference to other similar offerings. Therefore an advertisement must commend, *i. e.*, it must be so designed as to convince the beholder not only of the desirability to purchase but to the absolute advantage of purchasing it from that particular seller or store.

[1] Read at the annual meeting of the New Jersey Phamaceutical Association, Atlantic City, June 11, 1919.

Turning our attention to the various methods of advertising, we find that the majority of people limit themselves to newspapers, programs, circulars, placards and widow displays. To the average pharmacist, especially in the larger cities, newspaper advertising is not only prohibitive because of its expense, but is actually useless because of the fact that he has to pay for large circulation in order to reach a relatively limited few within his business radius.

It is not my intention at this time to enlarge upon the advantages or disadvantages of newspaper advertising, nor will I take up those other forms of advertising which involve an outlay of money. These methods are valuable and when properly employed are bound to yield rich returns.

I shall limit myself to that class of advertising which is practically free from expense, readily at the disposal of every pharmacist, and which not only is sure to yield a rich harvest in direct returns but which also has cumulative effect, bringing, as it were, compound interest. We can classify these methods under four main headings: (1) show windows, (2) arrangement of the store interior, (3) personal, that is individual, direct advertising, (4) service.

A casual glance at the average drug store window will convince the observer that pharmacists, with very few exceptions, are philanthropists of a high order. Is there anyone in this audience who is willing to contradict me when I say that any man is a philanthropist who spends at least 25 per cent. of annual store rental for the noble purpose of helping along the poor (?) and deserving (?) manufacturer of proprietary medicines?

It is true that in return for the use of your store window and store front, the manufacturer is kind enough to supply you with the dummies and signs for display, and will even go as far as allowing you to make a 10 per cent. gross profit, occasionally, on his goods, provided you buy enough at one time to last you forever and a day, and provided also that your neighbor on the next corner does not get ahead of you and bestow upon the dear public that 10 per cent. gross, which means about 15 per cent. minus, in order to create the impression that you are a highway robber.

There are many articles in the store which readily lend themselves for window display purposes. Every pharmaceutical journal has published volumes of information on that subject, and I shall

therefore merely call your attention to this phase of inexpensive advertising and leave it with you as a thought to take home as a "convention souvenir."

Store Arrangement.—The primary object of shelves, I suppose, was for the purpose of storing or keeping goods. The modern merchant, that is the successful one, however, is not so much concerned with keeping, as he is with selling the goods. Therefore the arrangement in the store should have that object in view and should be carefully planned and executed. You sell stamps, have a telephone booth or two, keep a directory more or less new, and offer other inducements to the passerby or to your neighbor to come into your store. But lest perchance he be tempted to purchase something that he did not intend to buy but merely because he sees it in the store, you place all your accommodation as near the door as possible, so as to keep him from seeing these goods and so to avoid leading him or her into temptation.

Should the potential customer penetrate your first line of defense and actually get a glimpse at your shelves or show cases, he is still protected against a possible impulse to buy. You have seen to it that the goods are in an "artistic" state of arrangement so that the wandering eye may not be caught by an alluring article of luxury. Nor have you been careless enough to mark the prices plainly on those articles which in spite of all care insist in protruding themselves on the unwary customer. The price on the article may show to the observer, that he could afford to buy it and, horror of horrors, may even lead him to do so—and that of course would be against all rules of altruism and philanthropy.

Personal, or Direct Advertising.—Some time ago, my boy received a postal card on the morning of his birthday anniversary. It was a picture postal card and had the greetings and the good wishes of a well-known clothing firm. It specifically mentioned the date and also age of the boy. Of course the boy was happy and mother was very much pleased with this attention. Do you think you could get either of them to go to any other store for the boy's furnishings?

Now supposing we find that Mrs. Jones or Smith or Brown is purchasing castile soap and germicides and cotton and gauze, and has a prescription for ergot, etc., it would not require the sagacity of Sherlock Holmes to figure out what is about to happen. And supposing furthermore that by a little judicious inquiry, or by having

someone detailed to watch the daily papers or in many of the numerous means for gathering news, we learn that the expected increase has arrived, and supposing furthermore, we have a neat little inexpensive card, or better still, a personal letter which tells the proud parents how happy we are to know that they are happy. Or supposing we sent a little sample of our pet talcum powder, or some other toilet article of our *own* make, with our compliments to the New Arrival. Do you suppose happy Mamma and proud Father will get real angry at you and come over and slap you on the wrist? If you think so, just try it. I have.

And last but not least: *Service.*—By service I do not mean servility, that has gone out of style with kings and other archaic institutions. I mean the kind and courteous attention which a gentleman may show another gentleman or a lady and only be the more of a gentleman because of such service. Prompt attention to the incoming customer. Courtesy whether a sale is made or not. All the legitimate available information asked for, and given in such a manner that it will create the impression in the would-be or potential customer, that there is truth indeed in the Biblical word: "Happy is he that gives and he that receives."

These are a few thoughts along the lines of legitimate, inexpensive and profitable advertising which I like to have you take home with you. And I have no doubt that most of you can elaborate on them and develop a system of advertising which will be both interesting and remunerative.

SIR WILLIAM CROOKES.

By Samuel P. Sadtler, Ph.D.,

Philadelphia, Pa.

On April fourth last, there died in England one of the most distinguished men in the chemical profession. Sir William Crookes had reached his eighty-seventh year, and during that long term of years he had made his name known in a number of branches of science, which touched upon a great many most interesting and useful discoveries. He was particularly noted by his extremely acute powers of observation, his marvelous experimental skill, and

his powers of philosophical deductions. His researches covered various fields of chemistry and physics, but chiefly those which were within the borderland of these two branches of science. His name was almost equally known, by his long-continued publication and his editorship of the *Chemical News,* one of the best known weekly chemical journals, and the authorship of a number of chemical and technical manuals.

He was one of that class of students who obtained their earliest chemical education at the Royal College of Chemistry, then under Professor Hoffmann, from which institution it will be remembered, came the brilliant work of Perkin, and the discovery of the first of the aniline dyes, together with other valuable work, about the middle of the last century.

Crookes, for a short time, acted as an assistant to Hoffmann and became a lecturer on chemistry in Chester, but after a short teaching experience he returned to London and founded the *Chemical News,* which he edited almost to the end of his long life. It is interesting to note that among the earliest matters which appeared in this journal, were Crookes' reports on Faraday's famous Christmas lectures at the Royal Institution on "The Chemical History of the Candle."

About this period the researches of Bunsen and Kirchoff on spectrum analysis, leading to the discovery of cæsium and rubidium, were made known to the scientific world. Crookes immediately became interested in the use of this new method of analysis and with its aid made his first important contribution to chemical science in the discovery of another new element—thallium. His researches upon the new metal led him into the study of other materials, with the aid of spectrum analysis and he made an extensive study of pure selenium. In connection with the very careful study of these relatively rare metals, Crookes was led to make his weighings on a delicate balance in vacuo. When these weighings were made in this way and in full daylight, irregularities in the action of the balance became evident to the keen observer. He thus found that light objects which were free to move in high vacua could be made to do so by mere exposure to light, and the result was the discovery of the now familiar "Crookes' radiometer," the vanes in which are set in rapid motion when a beam of sunlight is allowed to fall on the apparatus. This study of such "repulsion resulting

from radiation" was pursued by Crookes with extraordinary skill and ingenuity in devising experiments in various directions, and thus he opened up a new and wonderful field for research in molecular physics.

After considerable study of this radiometer the conviction was established that the motion of the vanes in the instrument was probably due to their bombardment by the residual molecules of the high rarefied air in the bulb, being projected from the sides of the same against the movable vanes. Crookes devised many beautiful experiments in this connection and he was thus led on to the study of kathode rays and the bombardment with them of various forms of solid matter which became phosphorescent under their impact. In this way, Crookes developed his theory as to the existence of radiant matter, which he considered a fourth form of matter, showing properties not possessed by matter in solid, liquid or gaseous form.

We have more recently come to speak of emanations in connection with radio-active matter, but it is interesting to note here that Crookes in his earlier researches paved the way for much of our present understanding of radio-active phenomena. One of Crookes' inventions developed after the beginning of the work on radio-activity was the "spinthariscope" in which a screen of natural zinc sulphide is made to scintillate by the alpha particles projected from radium, which furnishes us one of the most beautiful demonstrations, at once visible to the eye, of radio-activity. Crookes made many other very delicate and skillful experimental studies in this same connection of radio-activity, studying the radio-emanation upon a great variety of materials.

In any account of Crookes' career, we must not omit to note many of his speculative addresses and papers, as for instance his interesting paper on the genesis of the elements, delivered as an address to the Chemical Section of the British Association in 1886 at Birmingham. He also became more or less of a spiritualist and wrote a number of papers dealing with these phenomena, which are again exciting the interest of a number of scientific men, perhaps more in England than in this country. One of the most interesting of Crookes' addresses was his address as President of the British Association at Bristol in 1898 in which he discussed the nitrogen problem and called the attention of the scientific world to the rapid exhaustion of the natural nitrogen-containing minerals and the

need of some method for the fixation of atmospheric nitrogen to supply the growing world demand for fertilizer material. There is little doubt but what this address of Crookes', which attracted wide attention at the time, drew the attention of scientific investigators to the question of the synthesis of nitric acid and other nitrogen-containing materials which has culminated in such magnificent results in the various processes of nitrogen fixation, both direct and indirect, which are now being applied in almost every country where the conditions of economical power are such as to make them possible.

Crookes served on many public commissions and lent his powers of observation and analysis to the solution of many technical problems, furnishing a fine illustration of the value of a scientific man to the public welfare, when demands arose for such a study of the public needs and national problems.

Crookes had been a member and president of the several English societies interested in chemistry, including the Royal Society, the English Chemical Society, and the Society of Chemical Industry. He also received the highest honors, including that of knighthood, from his own country.

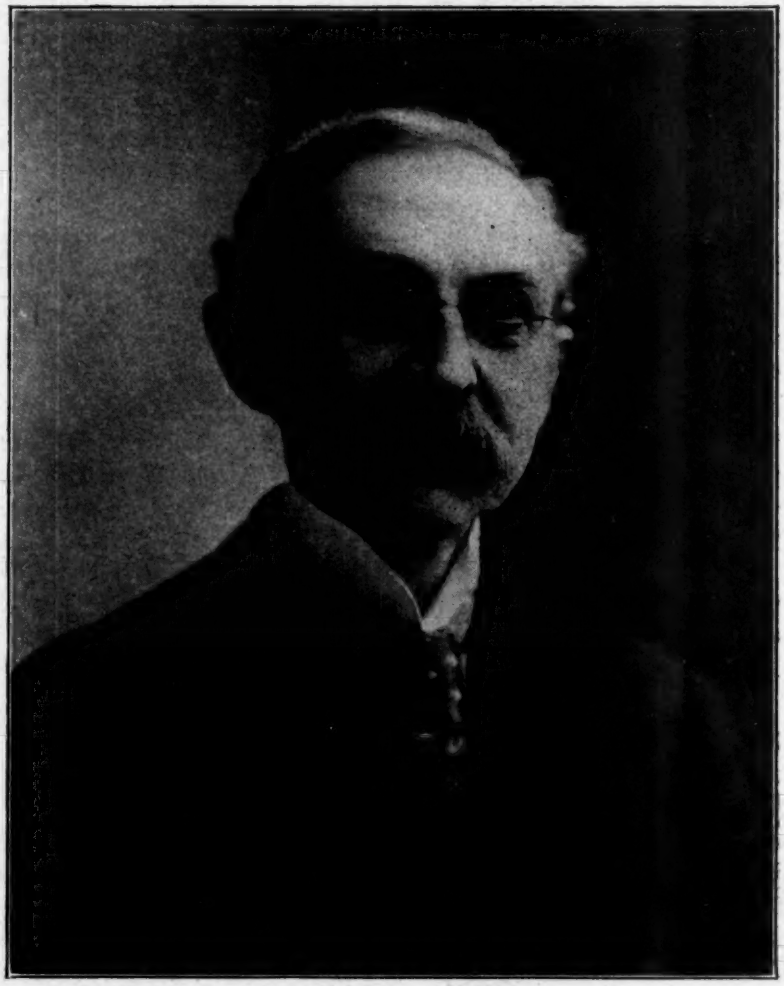
Crookes illustrated in a very notable degree what might be called a distinguishing character of many English scientific men, namely the ability to do brilliant work in a number of lines, covering a wide field, and including chemistry, physics and technology.

JAMES MICHENOR GOOD.

By Henry M. Whelpley, Ph.M.,

St. Louis, Mo.

One by one the landmarks in American pharmacy pass away and the succeeding generation fills the places and continues the work. The most recent death attracting general attention is that of Professor James M. Good, who, after a gradual decline in health for a few years and a critical illness of several days, passed to the beyond. His going was as quiet and the funeral as unostentatious as had been the long and useful life of the man. He was cremated and the ashes buried in the same lot with those of Mrs. Good, who pre-



JAMES MICHENOR GOOD,
Born, January 12, 1842; deceased, May 15, 1919.

ceded him a few years ago. In keeping with his foresight and methodical habits, he sold his store ten days before his death.

Professor Good was not a rapid worker nor a man of quick action or snap judgment. He led a busy, steady and very resolute life. He was recognized wherever he went as a man of integrity and with a well-defined character. While not unchanging nor unchangeable in a broader sense, he remained adamant as far as his purpose and principles in life were concerned. His interest in national affairs and questions immediately vital to the country was constant and much of the time of the past few years was devoted to the reading of current literature dealing with world affairs. He was a staunch Republican in principle, but not dogmatic in politics. Born and raised and married as a Quaker, he continued a Quaker in spirit and principle throughout life. Being quite alone as Quakers, Professor and Mrs. Good early affiliated with the Church of the Unity, finding it an acceptable place for them to worship. Professor Good was for a quarter of a century a director in the church and for many years the treasurer.

The pharmacists of the country at large knew Good best on account of his long and active work in the American Pharmaceutical Association. He joined during the St. Louis meeting in 1871, became third vice-president in 1890 and president in 1895. His work as chairman of the council from 1888 to 1894 caused the officers and other active members to recognize his executive ability and parliamentary efficiency. In 1894, he served as chairman of the Section on Education and Legislation. Pharmaceutical literature received occasional contributions from his pen. They were always along educational, legislative or practical lines. His papers were very much to the point and free from embellishing verbiage. As a speaker, Professor Good held the close attention of conventions and made his points as he went along without eloquence or oratory.

In pharmacopœial affairs, Professor Good dates back to the convention of 1890. He was a member of the Committee on Revision from 1900 to the time of his death. He was also interested in the National Formulary and its propaganda.

Professor Good had an intense conviction of the value of pharmaceutical bodies and practiced his preaching that all druggists should support their local, state and national organizations. He joined the Missouri Pharmaceutical Association in 1880, was treasurer from 1883 to 1887 and president in 1888. He was secretary

of the St. Louis Board of Pharmacy which was created by city ordinance and in operation for a few years previous to the passage of the state law in 1879.

In local drug circles, Professor Good participated as soon as he located in St. Louis, in July, 1868. He filled offices in the successive retail associations that were active at one time or another during his fifty-one years in the city. He was president of the Cinchona Club at the time of his death.

Although known as a retailer, a teacher, a citizen, a husband and a father, it was as professor of theoretical pharmacy in the St. Louis College of Pharmacy that he became familiar to the greatest number of druggists of the Mississippi Valley. He began in the school as vice-president in 1873, being elected to the faculty when Professor Hubert Primm retired in 1875. He gave up teaching in 1916 and became emeritus professor. It was in 1880 that he was elected dean, continuing the work until 1904. Professor Good started life as a farmer boy and he received his early education in the local schools of eastern Pennsylvania. Going to Philadelphia in 1865, he taught for a time in the Friends' School. He attended the Philadelphia College of Pharmacy, completing the junior course in 1867–1868. He often referred to his being a member of private classes under Professor Parrish. His instructions in pharmacy took the pedagogic form. He was quite as particular about having students dot the "i" and cross the "t" as he was in bringing the pupils up to the standard on purely pharmaceutical information.

During the half century in which he was active in the pharmaceutical world, he was always held in high esteem. The Missouri Medical College conferred on him the degree of doctor of medicine. He received from the Philadelphia College of Pharmacy the degree of master of pharmacy at the same time as George M. Beringer, whom he thereafter addressed at "Brother George." He felt particularly dear and near to several men prominent in the pharmaceutical activities, located in different sections of the country. He considered it a privilege to have been intimately acquainted with men along the line from the days of Markoe, Parrish, Maisch, Bedford, Ebert, Hallberg and Remington. He was far from a hero worshiper, but glad to recognize and give full credit to the worth of such men.

It was in Philadelphia in 1865 that James M. Good apprenticed to the firm of B. N. Bethal & Co. He always considered himself a

Philadelphian, although recognizing his obligation to St. Louis, which to him was the city of his adoption. His early experiences in the retail business in the Mound City were very pleasing, bringing him in intimate association with the leading physicians of the day. His first location was at 22d and Clark Avenue, where he remained for twelve years. He then moved to the southeast corner of Jefferson Avenue and Olive Street, where he was until fifteen years ago, when changes in the building necessitated moving and he bought out a competitor on the northwest corner of the same street. The neighborhood had decidedly changed. Many customers and physicians urged him to join them in the western part of the city, but he remained at his old post even though the trade was not of as congenial a character.

The Good Pharmacy always had plenty of clerks. They were given ample vacations and treated in a way that won the universal praise and esteem of all who ever worked in the store. Professor Good believed in the apprenticeship system and was thorough in drilling those who came to him to learn the business.

J. M. Good formed the personal acquaintance of one salesman in each line which he handled and gave them his exclusive business. Other salesmen who called were treated courteously, but found themselves unable to obtain orders. He had his own ideas about conducting business and became quite vexed and even resentful when, a few years ago, I suggested to him that a partner might assume some of the responsibility of the store and relieve him of worry.

A good physique and excellent health were among the assets in life which Professor Good enjoyed. He was plain but neat in dress, reserved but courteous to strangers. He was fond of horses but never ventured to run an automobile. His tenderness of heart for dumb animals is illustrated by an incident which a former clerk relates. A salesman drove up on a cold, stormy day and rushed into the store without blanketing his horse. Professor Good saw the animal shiver and asked the salesman why he did not put on a blanket. The man said that he was in a hurry to get in the store. Professor Good answered, "I will give you time to go out and blanket the horse and you need not come back for an order to-day."

Professor Good was 100 per cent. American long before that expression became commonplace, during the World War. In fact, he was a man who measured up 100 per cent. in all of his ruling

traits of character. Many and interesting are the anecdotes and other pleasing experiences with him which might be recorded if space would permit.

Professor Good is survived by a sister and a married daughter, the latter now Mrs. T. Conzelman, who, as a child and young lady, attended many meetings of the A. Ph. A.

A BILL TO IMPROVE THE STATUS OF THE HOSPITAL CORPS OF THE UNITED STATES NAVY.

On June 4, Congressman George P. Darrow, of Philadelphia, introduced a bill designed to effect a commissioned organization of the Navy Hospital Corpsmen which was referred to the Committee on Naval Affairs. During the war the ability of the naval hospital corpsmen was tested in many ways and, in the opinion expressed by many of the naval officials who were in a position to observe the results, they acquitted themselves very well. The navy has for many years been developing a plan for better hospital service and for gradually securing in this service a higher grade of young men whose personnel and attainments would justify advancement to commissioned rank.

Under the provisions of the war measure, providing for the enlarged navy contemplated, a number of the chief pharmacists of experience in this branch of the navy were temporarily commissioned. The purpose of the proposed enactment is to make the ratings then granted permanent and to establish an efficient Hospital Corps as a recognized branch of the Navy Medical Department and under conditions that would induce men of education and ability entering this necessary line of the service.

Pharmacists in civil practice should give this measure their whole-hearted support and endeavor to secure the passage of this bill as an encouragement to those who are endeavoring to serve their country as pharmacists in the navy hospital corps and often under very trying conditions. The pharmaceutical organizations and the pharmaceutical journals will doubtless energetically support the measure, which is reprinted in full as follows. The AMERICAN JOURNAL OF PHARMACY unqualifiedly endorses the bill and hopes for its early consideration and passage.

H. R. 4760.

A BILL.

TO INCREASE THE EFFICIENCY OF THE MEDICAL DEPARTMENT OF THE UNITED STATES NAVY AND TO IMPROVE THE STATUS AND EFFICIENCY OF THE HOSPITAL CORPS OF THE UNITED STATES NAVY.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the President of the United States is hereby authorized to appoint and commission, by and with the advice and consent of the Senate, officers in the Hospital Corps of the Navy, in addition to chief pharmacists and pharmacists, at the rate of one for each two thousand of the total authorized number of officers and enlisted men of the Navy and Marine Corps, with ranks of lieutenant commander, lieutenant (junior grade), and ensign, which ranks are hereby established, who shall perform such duties in the Hospital Corps, as part of the Medical Department of the Navy, as may be prescribed by the Secretary of the Navy. Original appointments to fill vacancies shall be made in the rank of ensign, Hospital Corps, United States Navy, by selection from the total number of chief pharmacists and pharmacists, United States Navy, the board of selection for naval medical officers, whenever convened, to constitute a board for this purpose. Chief pharmacists and pharmacists, so selected, shall, prior to promotion be required to successfully pass a physical, mental, moral, and professional examination before medical and professional examining boards appointed by the Secretary of the Navy, and shall have been recommended for appointment by such board. Officers so appointed shall, after serving as ensign, Hospital Corps, United States Navy, for three years, be eligible for promotion to the rank of lieutenant (junior grade), Hospital Corps, United States Navy, and when so promoted shall take rank and precedence with officers of the Naval Medical Corps of the same rank according to the dates of their respective commissions, and such officers shall be eligible for advancement in rank in the same manner and under the same conditions as officers of the Naval Medical Corps with or next after whom they take precedence, and shall receive the same pay and allowances as officers of corresponding rank and length of service in the Naval Medical Corps up to and including the rank of lieutenant commander. Officers of the rank

of ensign, Hospital Corps, United States Navy, shall receive the same pay and allowances as officers of the same rank and length of service in the line of the Navy: *Provided,* That lieutenant commanders, Hospital Corps, United States Navy, shall be eligible for selection by the board of selection of naval medical officers, for advancement in pay and allowances, but not in rank, to and including the pay and allowances of commander and captain, subject to such examinations before advancement as the Secretary of the Navy may prescribe, except that the number of lieutenant commanders with the pay and allowances of captain shall not exceed 4½ per centum and the number of lieutenant commanders with the pay and allowances of commander shall not exceed 8 per centum of the total authorized number of officers in the Hospital Corps, exclusive of chief pharmacists and pharmacists: *Provided further,* That lieutenant commanders, Hospital Corps, United States Navy, shall be eligible for advancement to the pay and allowances of commander and captain when their total service as officers, exclusive of their service as chief pharmacists and pharmacists, in the Hospital Corps of the Navy is such that if rendered as officers of the Naval Medical Corps it would place them in the list of medical officers with pay and allowances of commander or captain, as the case may be: *And provided further,* That officers of the Hospital Corps of the Navy who shall have gained or lost numbers on the Navy list shall be considered to have gained or lost service accordingly. Ensigns, lieutenants (junior grade), lieutenants and lieutenant commanders, Hospital Corps, United States Navy, shall become eligible for retirement in the same manner and under the same conditions as now prescribed by law for officers of the Naval Medical Corps, except that section 1445, Revised Statutes of the United States, shall not be applicable to these officers and they shall not be entitled to rank above lieutenant commander on the retired list, or to retired pay above that of captain: *And provided further,* That chief pharmacists and pharmacists appointed assistant surgeons (temporary), United States Navy, pursuant to an act of Congress approved May 22, 1917, volume 40, Statutes at Large, page 84, entitled "An act to temporarily increase the commissioned and warrant and enlisted strength of the Navy and Marine Corps, and for other purposes," shall, upon the passage of this act, subject to passing such examinations as the Secretary of the Navy may prescribe,

be immediately eligible for appointment as ensign, lieutenant (junior grade), lieutenant, or lieutenant commander, Hospital Corps, United States Navy, in the ranks held by them as temporary assistant surgeons: *And provided further,* That if any such officer in examination be found by the naval examining board not qualified for appointment in the rank held by him, such board will proceed with the examination and determine the rank, if any, for which such officer is qualified, and shall report its findings and recommendations to the Secretary of the Navy, and if it be found that any officer so examined is not qualified for appointment in the rank for which examined, or in any lower rank, the board shall so report, and if such officer be found not qualified for appointment, or shall refuse to accept appointment in the rank for which qualified and recommended, his temporary commission as assistant surgeon, United States Navy, if still in force, shall be revoked; *And provided further,* That officers so commissioned in the Hospital Corps of the Navy shall retain the precedence with officers of the Naval Medical Corps that they held as temporary assistant surgeons, except that officers found qualified for a lower rank than that held by them in the temporary Navy shall be given a date of precedence as determined by the Secretary of the Navy: *And provided further,* That nothing herein contained shall be construed to legislate out of the service any officer now in the Medical Department of the Navy or to reduce the rank, pay or allowances now authorized by law for any officer of the Navy.

PHARMACY IN THE ITALIAN ARMY.[1]

One of my most interesting experiences, during the five years of war, was the time spent with the Italian Army. I arrived with the British and French troops, sent to the assistance of our Italian comrades, in the black days of November, 1917. The Italians, after a series of magnificent victories and after almost superhuman military engineering feats in the construction of roads and tunnels over inaccessible mountains, had suddenly collapsed, and were in full retreat before the Austro-German forces. The arrival of the British and French troops stemmed the tide of the Austrian advance and the Italian Army made the finest recovery in history.

[1] Reprinted from *The Chemist and Druggist,* June 14, 1919.

The Austrians were held on the Piave, and, on the mountain passes, their renewed attack in the following June was repulsed with the heaviest loss, and they were hurled back into their own territory in October, 1918.

As in the case of the French *Service de Santé* in order properly to appreciate the position held by pharmacy in the army of our Italian Allies, it is necessary briefly to sketch the organization of the Italian Medical Service. Italy as a unified kingdom is of so recent a date that its Medical Service might be thought to have no history; but this is hardly the case, for so far back as 1833 we find an organized service in what was then the kingdom of Sardinia, with one pharmacist to about every ten medical officers. It is noteworthy, also, that the organization of the Army Medical Service, in the form of autonomous medical units, was adopted earlier in Italy than in any other continental country.

The Army Medical Inspectorate at the Italian War Office consists of an Inspector-in-Chief, assisted by five inspectors, of whom one is a pharmacist officer designated "Inspector of Pharmacy and Chemical Services."

GRADES OF THE ITALIAN MEDICAL SERVICE.—The medical officers of the Italian Army and Italian Red Cross—to which I will refer subsequently—have ordinary military titles followed by the word "Medico." Pharmacist officers do not, however, hold ordinary military titles. They are graded as follows:

Chemico farmacista ispettore, ranking as colonel.

Chemico farmacista direttore, ranking as lieutenant-colonel.

Farmacista Capo di 1a Classe, ranking as major.

Farmacista Capo di 2a Classe, ranking as captain.

Farmacista di 1a Classe, ranking as captain also, but drawing less pay than the *Farmacista Capo di 2a Classe.*

Farmacista di 2a Classe, ranking as lieutenant.

Farmacista di complemento di 3a Classe, ranking as second lieutenant.

As in the case of the Australian Commonwealth Forces, there are no distinctions in the emoluments of different branches of the Italian Army. All officers, whether combatant, medical or pharmaceutical, draw the pay of the rank to which they belong. Medical officers draw a small additional special allowance, but the privilege is not shared by their pharmaceutical colleagues. Pharmacist and medical officers wear the same field gray uniform as other officers,

the color of which is now fairly familiar in the streets of London. The different regiments, administrational and other services, are distinguished by different colored, gorget patches. Medical officers wear dull cherry-colored, and pharmacists black patches, on their collars. All grades of the Italian Army, from private to general officer, wear the five-pointed star of United Italy on the collar-patch. Medical officers and pharmacist officers of the Italian Red Cross have the same badge as military ranks, but with a small red cross in the center of the star. The cap badge of all grades of the medical service is a five-pointed star enclosing a minute red cross and surmounted by the royal crown.

THE MEDICAL SERVICE IN THE FIELD.—The medical service with an army in the field is divisible into three groups: (1) Divisional, (2) Corps, (3) Army.

1. *Divisional.*—As in the French Army each regiment—which, it will be remembered, corresponds with a British brigade—has its own regimental medical staff, but in the Italian Army there is no pharmacist officer in charge of the regiment, as with the French. Each division has one *Sezione di Sanita,* which is responsible for the evacuation of wounded from the regimental aid posts back to the field hospital. There is no pharmacist with this formation, which corresponds with the *Groupe des Brancardiers Divisionnaire,* or Divisional Bearer Company of the French rather than with our field ambulances.

2. *Corps.*—The Italian Army is organized on a corps basis, and therefore the *Direttore di Sanita,* who corresponds with the Deputy Director of Medical Services in our army, has much more power and authority than has his British colleague. The Italian officer corresponding with our Divisional A.D.M.S. is only a major, and has comparatively little administrative work or responsibility. In our army the Divisional A.D.M.S. and Corps D.D.M.S. are both full colonels, and, whereas the former has three units under his immediate command, the latter has no medical formations under his direct control.

Each Italian corps has attached to it from twenty to thirty *Ospedali di Campo,* with an aggregate of two thousand beds. *Ospedali di Campo* are field hospitals, and provide accommodation for 50, 100 or 200 patients.

It is with the hundred-bedded hospital that we first find the pharmacist officer. The personnel of these units is: Three medical

officers, one pharmacist, two quartermasters, thirty-eight rank and file.

The Director of Medical Services of the Italian Corps takes over all wounded and sick at the *Posto Smistamento,* or divisional dressing-stations of his divisions, and distributes the cases to these field hospitals. The *Ospedal di Campo* therefore act as casualty clearing stations for the divisions. They are mobile, but may be immobilized for special work, such as infectious hospitals. On the plains they are located in palaces, villas, schools or theaters, but in the mountains special wooden huts are erected for them by the engineers. All are furnished with collapsible iron beds, sheets and blankets. In all these hospitals special attention is given to the *Farmacia,* which I found invariably well stocked and equipped.

DISINFECTION AND WATER-SUPERVISION UNIT.—With each corps is a special unit, corresponding, more or less, with our sanitary sections, but equivalent in strength to four of our sanitary formations. There is a medical officer in charge, a pharmacist officer, two engineer officers, and one hundred other ranks.

The pharmacist officer is the consulting chemist and analyst of the section, and, by virtue of his position, the adviser on all chemical matters to the Director of Medical Services of the Army Corps. In an Italian Army Corps he, therefore, holds a responsible and honorable position which has no analogue in the British service.

3. *Army.*—An Italian Army consists of a group of three or more army corps. The medical services of each Army is under the direction of a *Direttore di Sanita d'Armata,* who is a *Maggiore-Generale Medico,* or surgeon-general. He has on his staff eight medical and four pharmacist officers. The Chief Pharmacist of the Army is responsible to the director for the care of all drugs, dressings, medical and surgical appliances in the Army area. He carries out, on behalf of his chief, inspections of military pharmacies, chemical and scientific laboratories and advanced depots of medical stores.

CARE OF MEDICAL AND SURGICAL STORES.—As in the French and other Continental armies, the care of medical and surgical stores is entirely in the hands of pharmacists. In our Army the care of advanced and base depots of medical stores has been in the hands of Royal Army Medical Corps quartermasters throughout the greater part of the European War. In the South African and all previous wars, these depots have been commanded and administered by medical officers.

The chief source of drugs, dressings, and medical and surgical appliances for the Italian Army is the *Farmacia Centrale Militare* at Turin, which is under the command of the *Chemico Farmacista Direttore,* who has a large staff of pharmacist officers and subordinates.

The Central Military Pharmacy is organized in six sections, each under the command of a pharmacist officer. These sections are as follows:

(1) Analytical Laboratory.
(2) Pharmaceutical Laboratory.
(3) Quinine Factory.
(4) Bacteriological Laboratory.
(5) Surgical Dressing Mill.
(6) Packing, Receiving and Distributing Stores.

The "Pharmacy" is, in short, a wholesale drug-store of the largest and most up-to-date kind. The machinery for making tablets is of the most modern description, and the preparation of hypodermic solutions is a special feature of the establishment. All hypodermic solutions are packed in small phials containing one dose.

The quinine factory was, before the war, the most important part of the pharmacy. It supplied not only the Army, but many civil institutions in Italy and elsewhere. Malaria is common in parts of the kingdom, and, as in India, the state, aided by the *Croce Rossa Italiana,* makes special arrangements for the sale and gratuitous distribution of quinine to the public.

The Central Pharmacy was able to turn out 300,000 five-grain tablets of quinine daily, and, in addition to supplying its own needs before the war, the Italian Government was able to export quinine to Turkey, Greece, the Balkan States, and many other countries. The Central Pharmacy distributes supplies to regional and army pharmacies, on which all military hospitals and formations in the region or army indent for their requirements.

Recruitment of Pharmacist Officers.—The Italian Army Medical School is at Florence. It is an institution exactly similar to our Royal Army Medical College. Like our college, it differs from the French and other continental military medical schools in the fact that it is attended only by graduates in medicine of the universities who are candidates for commissions in the regular army or for the rank of surgeon-lieutenant in the reserve. Pharmacists do not pass through this school. Students of pharmacy enter com-

panies of the Army Medical Service, and on passing an examination become pharmacist cadets with the rank of corporal or sergeant. On graduation in their universities they go through a special course of instruction, and may then present themselves for examination for advancement to the rank of *Farmacista di Complemento di 3a Classe* (pharmacist officer of the reserve), with the rank of second-lieutenant. On attaining this rank the pharmacist officer may serve the remainder of his period of liability to military service in the reserve, or may enter for a competitive examination for a commission in the standing army. If successful he is gazetted a *Farmacista di 2a Classe,* with the rank and pay of lieutenant.

From this grade he is promoted by seniority or selection. In peace there are, as in the case of the British service, medical officers' examination for each step in rank, but these are, of course, abolished in war time.

In addition to the pharmacist officers and cadets there is a considerable personnel employed on pharmaceutical duties. These are the medical assistants or *aiutanti di sanita,* who are recruits from among the students of medicine, science, and pharmacy of the universities. Young priests are also liable for service as medical assistants. These medical assistants have the rank of corporal and lance-corporal, forming a section in each company of the Army Medical Service apart from the nursing, clerical and stretcher-bearer sections.

In addition to the pharmacists of the Regular Army the Italian Red Cross, or *Croce Rossa Italiana,* employs a very large number of graduates in pharmacy of the universities.

The Red Cross enjoys a very honored and important position in Italy, and its personnel is to some extent exempted from ordinary military service.

It has long anticipated the present scheme for utilizing the Red Cross in peace time, and had, for instance, a well-organized anti-malarial service long before the war. Quinine was distributed at the expense of the government and of the society by trained pharmacists.

It will be seen by readers of the article on "Pharmacy in the French Army,"[2] that the profession of pharmacy holds a high and honored place in the French Army, but that, although Italy is almost as democratic a country as France, the pharmacist official is

[2] *Chemist and Druggist,* June 7, p. 50.

on a somewhat lower plane than with the army of the Great Republic, where the *pharmacien* and *médecin* are, in every sense of the term, "Brothers in Arms."

M.D., L. P. S. I.

THE PURITY OF COMMERCIAL ASPIRIN AND ASPIRIN TABLETS.[1]

By A. J. Jones.

In the earlier stages of the manufacture in this country of aspirin, it was almost impossible to maintain a supply of the product of the recognized standard, such a condition of affairs being what is expected when the inexperience and difficulties attending a new manufacture are taken into account. Some samples were very good, others graded down to products that could not be passed at all, whilst frequently the purchaser's only option was to buy the least faulty samples on offer at the time. Many were not of the standard of the British Pharmacopœia, and the opinion was even expressed that the official standard was commercially impossible. The characters and tests of the British Pharmacopœia do not admit the question of grade, nor are they sufficient to offer any help when that matter becomes involved. In such cases a more detailed examination is necessary, and the present paper is a note of results and observations made in this direction. The samples are of moderately recent date, and, since a much better stage of stability in the manufacture has now been reached, these are fairly representative of the current market.

Methods of Testing.

The tests used in the case of the samples of aspirin in question consist of determinations of acid, ester, and bromine values, together with free salicylic acid, and melting-point. For the better comparison the results are expressed in Cc. $N/5$ per 1 gram of substance, the bromine value being reduced to terms of a monobasic reaction: that is to say, one atom of bromine per molecule. Under these conditions it is clear that with true acetylsalicylic acid the

[1] Reprinted from *The Chemist and Druggist*, April 26, 1919.

three sets of figures should be identical. The details of the proning the caustic into the acid.

The bromate solution consists of potassium bromate ($KBrO_3$) 5 grams and potassium bromide (KBr) 20 grams, water 1,000 Cc.

The N/10 thiosulphate is standardized against the iodine liberated from potassium iodate (KIO_3) and potassium iodide (KI) by a given amount of the $N/5$ acid used above, this precaution being taken so that strict comparison is possible, all titrations being really in terms of one standard solution—the original $N/5$ acid
soda free from carbonate, setting this with phenolphthalein and run-

Determining the Acid and Ester Value.

One gram of the sample is accurately weighed and rinsed into a flask with about 15 Cc. of absolute alcohol (B.P.); solution being complete, phenolphthalein is added, and the titration made with the $N/5$ soda. Fifty Cc. of the same soda solution is now added from a pipette, and another 50 Cc. taken, draining the pipette in exactly the same manner, for a blank. Reflex tubes are fitted, the flasks set in a water-bath for about twenty-five minutes, then cooled and titrated back with the acid; the difference between the blank and test titers being the number of Cc. $N/5$ equivalent to the ester, and cedure adopted in the tests are as follows:

Standard N/5 acid is prepared and a similar solution of caustic should (theoretically) be identical with the acid titration.

As it is quite possible for slight hydrolysis to occur while determining the acidity, comparative tests were made by estimating the difference in the amount of free salicylic acid before and after titration. Standard acid, equivalent to the number of Cc. of alkali used in the test, was returned to the titrated liquid before the comparison was made by the iron test. Half a gram of aspirin was used, and it was found that 0.1 to 0.5 milligram were the extreme limits due to titration, with a fair average of 0.3 milligram—or, say, 0.02 Cc. $N/5$—for one gram. Since this is accompanied by its equivalent of acetic acid an adjustment is required in the relative acid and ester values. One should, therefore, deduct 0.02 Cc. from the experimental acid figure and add it to that of the ester.

The Bromine Value.

Accurately weigh 0.5 gram of the acetylsalicylic acid, wash into a flask, add 15 Cc. $N/5$ soda, and set in a water-bath as described

RESULTS OF THE EXAMINATION OF SAMPLES OF ACETYLSALICYLIC ACID.

Origin.	Acid Value.	Ester Value.	Total.	Bromine Value.	Salicylic Acid, % ex Br. Value.	Free Salicylic Acid.		Melting Point.	Behavior with Iron.	In Soda Solution.	
						%.	Equivlt. c.c. N/5 per Gram.			Color.	Odor.
Theory	27.769	27.768	55.537	27.769	76.66	0	0	133–135° C. and 137° C.	—	—	—
GROUP I											
1. N. England	27.74	27.70	55.44	27.78	76.68	0.05	0.02	135–136	clear	pale straw	faintest trace of pyridine
2. S. England	27.60	27.59	55.19	27.67	76.38	0.3	0.11	132	clear	yellow	not at all good
3. S. England	27.70	27.58	55.28	27.82	76.78	0.075	0.03	135–136	clear	pale straw	none
4. Japan	27.83	27.43	55.26	27.69	76.42	0.113	0.04	134	clear	full yellow	distinct smell of acetic ether
5. N. England	27.78	27.43	55.21	27.78	76.68	0.20	0.07	—	clear	full yellow	very objectionable
6. S. England, same make.	27.68	27.43	55.11	27.70	76.46	0.15	0.05	132–134	clear	pale straw	distinct traces of acetic ether
7. S. England, same make.	27.60	27.42	55.02	27.67	76.38	0.175	0.06	132–134	clear	pale straw	
8. London broker	27.58	27.33	54.91	27.73	76.54	0.075	0.03	135	faint opalesc.	—	—
9. London broker	27.78	27.22	55.0	27.68	76.40	—	—	—	—	—	—
10. Unknown	27.96	27.23	55.19	27.66	76.34	0.125	0.045	134	clear	buff	slight odor
GROUP II											
11. American, same shipper	27.20	28.02	55.22	27.89	76.98	0.05	0.02	132	very turbid	very pale straw	faint pyridine and salol
12. American, same shipper	27.25	28.02	55 27	27.89	76.98	0.05	0.02	132			
13. Manufacture ceased	27.24	27.92	55.16	27.89	76.98	0.125	0.045	134–135	slight opalesc	pale straw	trace, aniline-like, with suggestion of salol
14. Manufacture ceased	27.48	27.73	55.21	27.64	76.30	0.10	0.036	134–135	clear		
15. London Wholesale House	27.38	27.68	55.06	27.83	76.82	0.10	0.036	131	very turbid	straw	strong aniline-like

* Free salicylic absent by B.P. test.

above. After the twenty-five minutes this solution is cooled to room temperature, diluted and transferred to a 250-Cc. flask, and carefully adjusted to the volume and well shaken. One should be sure either that the instruments are exact or else take the precaution of graduating the flask by ten deliveries, each made in exactly the same manner, from the 25-Cc. pipette about to be used. Twenty-five Cc. is withdrawn by a pipette and delivered into an accurately stoppered 16-oz. shop round; add 25 Cc. of the bromate solution, also very accurately delivered, and then 250 Cc. of water. Fifteen Cc. of hydrochloric acid (B.P.) is added, and the bottle stoppered. A blank is prepared in precisely the same manner, and both are set aside for twenty minutes with occasional shaking. Fifteen Cc. of 10-per-cent. sodium iodide solution is then run in with all necessary precautions, the solution well shaken for a few minutes and then titrated with $N/10$ thiosulphate, using a solution of soluble starch as indicator. Duplicate tests agree to within 0.05 of a Cc.

To check both solutions and the manipulation comparison was made with two samples of specially prepared salicylic acid. In the test in question this showed 99.9 and 100 per cent. of the acid taken. From the difference between the blank and the test, the number of Cc. $N/5$ taken by one gram of the aspirin is calculated, dividing this by six—since six atoms of iodine thus shown are equivalent to one molecule of salicylic acid—there is obtained a number of Cc. which should (theoretically) exactly agree with the acid and ester figures.

Determining Free Salicylic Acid.

Dissolve one gram of salicylic acid in about 60 Cc. of alcohol, and then adjust to 100 Cc. with water; 10 Cc. of this liquid is diluted to 1,000 Cc., making 1 Cc. equal to 1/10 milligram of salicylic acid. Prepare also a 1-per-cent. aqueous solution of iron alum.

For the test, dissolve 0.6 gram of the aspirin in a measuring cylinder with 9 Cc. of alcohol, dilute with water to 90 Cc., and well mix. Take two precisely similar Nessler glasses. Into one pour 60 Cc. of the solution, into the other 30 Cc., together with 3 Cc. of alcohol, and adjust to the volume of the first; this gives a difference of 200 milligrams of aspirin in a mixture of equal parts of alcohol and water. One Cc. of the iron solution is added from a pipette to each, and the color matched by adding the standard salicylic-acid solution from a burette. Supposing 4 Cc. to be required, we then

have 200 milligrams aspirin = 0.4 milligram salicylic acid, or 0.2 per cent. The limit that admits of satisfactory matching is about 0.5 milligram. It has been found necessary to adopt this method because both aspirin and alcohol have an effect on the iron coloration.

The B.P. test, if used with a little discretion in the interpretation of "violet color," is good enough for detecting inferior samples, but in those cases where one hesitates as to whether a sample can be passed, it is sometimes a trifle misleading. The various factors effecting solubility, such as crystalline condition and surface effects, come into play, and where but slight traces are present, a comparison formed on the B.P. test may be reversed on complete solution, as in the test described. It is preferable to adopt the latter test and work to a definite limit.

Another modification of the test is described in the British Pharmaceutical Codex, the Belgian Pharmacopœia, and elsewhere—namely, that 0.1 gram of aspirin when dissolved in 5 Cc. of alcohol and 20 Cc. of water added should give no violet color with ferric chloride. It should be pointed out that in this strength of alcohol the coloration is strongly depressed, and further so by employing ferric chloride in preference to iron alum. It has been found that with this test, and using one drop of 5-per-cent. ferric-chloride solution, a sample containing 0.15 per cent. of free salicylic acid gives only a brownish yellow, with 0.2 per cent. a shade of pink to which serious exception cannot be taken, and with 0.3 per cent. a very distinct salicylic reaction. This test is a good guide for sorting-out purposes and in routine work, but it is not suitable for precise work. Increase in the iron still further depresses the coloration.

Deductions.

The first thing noticeable is, that there are two distinct varieties of commercial aspirin: one, where the acid is either equal to or exceeds the ester; the other, in which the ester is in distinct excess of of the acid as well as being in excess of theory in some cases; while in both groups the saponification value is consistent throughout, and always less than theoretical.

Acid and Ester Value.—On examining the figures for samples 1 to 10, it will be seen that if the determination by iron be assumed to measure the dissociated salicylic and acetic acids, in sample 1 the acid exactly agrees with the ester (27.72 and 27.72), and also very

nearly so in the case of sample 3 (27.67 and 27.61), as required by theory, whilst sample 2 is placed in the other group. But in the remaining samples, for a constant value in the ester, the acid varies in the ratio of from 100:100.7 to 100:102.7, and the presumed dissociation does not account for this difference in any degree. It, therefore, appears that there is a certain acidity either in the preparation or developed in solution of many samples, which is neither due to free salicylic acid alone nor to dissociated acetylsalicylic acid.

Bromine Value.—In considering the bromine value in its relation to the acid and ester, in the case of the first group, it is seen to approximate the acid value rather than the ester. This is what one would expect, since it is the salicylic group in the molecule that is responsible for both figures. It might further be supposed that any dissociation would be reflected in the acid value exceeding the bromine, the difference being due to dissociated acetic acid and equal to the free salicylic found by the iron test in terms of $N/5$ soda per 1 gram. If the salicylic acid found occurred as such, and not as a product of dissociation, both acid and bromine value should agree, but on looking into the figures this is seen not to be the case. In eleven out of the fifteen examples the bromine is in excess of the acid, in Group I slightly, in Group II very markedly, and at the same time noticeably agreeing with the ester value.

With regard to these two points, after reviewing the figures and making allowances for the probable dissociation, it would appear that the excess of bromine in the first set of examples can best be explained by assuming salicyl-salicylic acid being present in minute quantities. In the second series one might expect acetyl-salicyl-salicylic acid to be in the main the contaminating substance, as with this substance there are two salicylic groups in the molecule and the ester value is also double the acid value, hence to the extent of its presence in aspirin both ester and bromine value would rise in agreement. Sample 15 is suggestive of both salicyl-salicylic acid and acetyl-salicyl-salicylic acid being present.

In this connection it has been observed that on taking about a gram of the aspirin, fifteen to twenty drops of methyl alcohol, about 8 Cc. of water and adding some crystals of sodium carbonate, warming to effect solution and then boiling for about half a minute, both during the operation and on allowing to cool a strong odor of methyl salicylate is developed in samples of the second group. In those represented by 2, 6 and 10 there is no trace of the wintergreen

odor, while others where the bromine value is high give a slight suggestion.

In the three exceptions (4, 9, 10), which might fall in with the above statement regarding the acid exceeding the bromine value, the excess acid is considerably greater than that due to dissociation, as indicated by the iron test, thus confirming from another point of view what has been said above regarding the occurrence of an acidity not due to acetyl-salicylic acid. This "excess" acidity is not open to any ready or easily demonstrable explanation, but the presence of such a body as salicyl-acetic acid, $C_6H_4 \cdot \overset{\displaystyle O \cdot COOH}{\underset{\displaystyle CH_2 \cdot COOH}{|}}$, in which there are two carboxyl to but one salicylic group, is very suggestive. With a chemical like aspirin, where a number of secondary products are possible, quite apart from real extraneous impurities, in the absence of specific reactions it is largely a matter of conjecture what the precise substances are that cause the variations in the analytical figures with different samples. That there are traces of other impurities present in some samples is certain, the peculiar odors in the crystals or powder frequently developed by treating with solvents and with alkali, and the different intensity in color of the caustic and carbonate of soda solution all show this. On treating with soda faint odors have been observed suggestive of salol, acetoacetic ester, pyridine, and anilin, and in some cases very strong and objectionable odors difficult to describe.

Suggested Standard.

The question now remains as to what analytical figures may be considered characteristic of the best grades on the market, and the following is suggested:

Where the acid value is greater than the ester value, that the difference should not exceed 0.3 Cc. $N/5$ soda per gram and the bromine figure should not exceed the acid value by more than 0.15 Cc. in similar terms. Where the ester exceeds the acid, the excess should not be more than 0.3 Cc. $N/5$ soda per gram, and in this case the bromine figure should not exceed the ester value.

For free salicylic acid the limit should be not more than 0.15 per cent., and no turbidity should occur in the iron test.

A good sample should also be given only a very pale straw color when dissolved in 10 or 20 per cent. soda, and there should be practically no odor either in the dry state, in soda solution, or when damped with spirit and water.

The melting point should not be lower than the present official standard. An experience of a very large number of samples shows that the best samples melt at approximately 136°. Such specimens have a decisive melting point, varying within a degree in consecutive determinations, and there is a sense of stability which is lacking with the lower figures. Samples which have given subsequent trouble in practical experience have almost invariably been those melting below 133° C.

It is sometimes urged that since one of the main objects in the use of acetylsalicylic acid is to provide salicylic acid in an esterified form, from which it is liberated under certain conditions by gradual hydrolysis, the occurrence in aspirin of small amounts of compounds such as salicyl-salicylic acid, which is itself used in medicine, is not a matter of real importance. What may be said for or against this from a pharmacological standpoint, or to what extent such contamination might be allowed in the drug, cannot be entered into here, but if this were agreed to then a test limiting values would be essential unless it is found—and there is a good deal to be said for this—that the present official tests with a definite limit for the free salicylic acid are such as will ensure a product of a sufficient degree of purity for all medicinal purposes, while not demanding refinements the attainment of which would throw an undue burden on the manufacturer without any practical or commensurate advantage to the patient.

Aspirin Tablets.

There seems to be an inclination in some directions to look upon tablets as mysterious composts in which very questionable ingredients may be safely hidden, and one finds a good many disappointments in examining these products. In the case of aspirin tablets excessive free acid, very high ester and excessive excipient balanced by deficient aspirin are the chief faults. On examining a series of what may be called "standard" makes all were found to be excellent products in very close agreement, but none was of that superlative quality in relation to any other as one might expect.

Disintegration is a property occasionally lost sight of, and one brand of "chemist's own label" variety, after digesting in water for two days, required firm pressure with a glass rod to break it up. The desideratum is that the tablet should be of good appearance, clean cut and pressed, able to withstand carriage—whether in bulk

or in the tablet-bottle in the waistcoat pocket—yet capable of immediate disintegration in water. In the "standard" series mentioned above all the samples were very satisfactory in this respect. On dropping the tablets into water and allowing them to remain for half a minute without agitation some "effloresced" into a powder, others swelled and parted, and all save one became powder on swirling the test-glass; the exception remained partially powdered, about half the tablet retaining its form, yet being quite soft and dissolving within a minute or two. In this connection it is interesting to note what must indicate variability in machining, which must occur, for on taking six or eight tablets, as was done with one brand, about half of them disintegrated within ten seconds, the remainder taking the full half-minute.

Analytical Precautions.

In the examination of tablets certain precautions are necessary on account of the excipient, which, apart from the usual starch, talc and adhesives, sometimes includes small quantities of a wax or fatty substance. Stearic acid has been noted in one or two cases, and if this and substances such as Japan wax are employed it is clear that for very precise work analytical procedure must be modified to meet them. A determination of the free salicylic acid by iron and the total by bromine is perhaps the most satisfactory means of evaluation. In the latter test it is best to extract the tablet with alcohol and filter; add alkali and distil off the alcohol during saponification, then follow the method indicated in the case of aspirin.

For the free salicylic acid, crushing the tablet and applying the B.P. test is not of much value where fatty excipients have been used since, while really containing quite the ordinary traces, the barest evidence is given in the water test. For the estimation it is best to take one, two, or three tablets, grind up in a mortar with 9 Cc. of alcohol and a little kaolin, adding 70 Cc. of water, and drawing through a Gooch filter, then washing with another 20 Cc. of water, the volume being adjusted finally to 90 Cc. and the determination completed as before. Since the difference is one third, it is useful to remember that by multiplying the number of Cc. of standard solution used to effect the match by 0.3 (since 1 Cc. = 1/10 Mgm.) one gets the milligrams of free acid in the tablets taken. For example: two tablets were treated as described, and required 3 Cc. of

the standard for matching; therefore the two tablets = 0.9 Mgm. of free salicylic acid and consequently one tablet (5 grs. or 324 Mgm.) = 0.45 Mgm., or 0.14 per cent. on the presumed aspirin content. In bad cases it may be necessary to make a dilution of one tablet and take an aliquot part of that, say, a fifth or even a tenth.

The following quantities have been found: (*a*) 0.12 per cent., (*b*) 0.16 per cent., (*c*) 1.85 per cent., (*d*) 0.14 per cent., (*e*) 0.185 per cent., (*f*) 0.06 per cent. Samples (*a*) to (*d*) are well-known brands of which (*c*) lays claim to a very high excellence in common with the others; (*e*) is a "chemist's own label" variety; and (*f*) occurs in trade without advertisement. Aspirin from the same source as (*e*) is shown as (2) in the acetylsalicylic acid table on page —. As to the limit of free acid allowable, 0.2 per cent. would cover all reasonable requirements and permit a small margin for deterioration due to the manipulation required in preparing the tablet mass.

The following table gives the analytical figures for five samples selected from different sources: The "values" are Cc. $N/5$ per 1 gram of the powdered-tablet mass just as in the case of the acid itself, the assay being on the alcoholic extract.

No.	Weight, Grains.	Acid Value.	Ester Value.	Bromine Value.	Free Salicylic Acid, Per Cent.	Aspirin.		Ash, Per Cent.
						Per Cent.	Per Tablet, Grains.	
1	5.60	23.73	23.44	23.91	0.12	86.08	4.82	None
2	5.66	24.62	24.48	—	0.12	88.15	4.98	2.25
3	5.50	25.25	25.17	25.10	Mere trace	90.36	4.97	4.54
4	5.46	21.63	22.98	21.78	Full react?	78.41	4.28	7.20
5	5.17	18.48	20.03	19.59	—	72.0 (approx.)	3.73 (approx.)	3.10

Number (1) is a semi-proprietary, (2) is from a wholesale house, and (3) from a firm of tablet-makers. Numbers (4) and (5) are examples of very inferior products, the last-named being obviously fraudulent.

It should be pointed out that the difficulty with aspirin is one of theory and practice. Acetylsalicylic acid is a definite chemical substance, but in the process of manufacture the difference of *technique* employed, together with the possibilities for secondary reactions, results in the production of an aspirin that departs fractionally from theory. If a manfacturer is producing a chemical which does

so depart, yet is commercially acceptable and medicinally satisfactory, he is hardly likely to modify his output. One has, therefore, to be prepared to meet variation in commercial samples, hence the suggestion earlier in this article. Users of aspirin must, however, exercise care in regard to the development of odor. Sellers will not always recognize the complaint of buyers in this respect, but it is very important. Odor sometimes develops to a remarkable and inexplicable extent in use, and on keeping, which no amount of reference to figures will negative. It is wise to put aside all samples that are the least suspicious in this regard.

It is hoped that the subject of aspirin standards may be of interest to others, and that some further expression of experience and views may be forthcoming.

This note is the result of work carried out in the analytical laboratories of Evans Sons Lescher & Webb, Ltd., at Liverpool.

THE CHEMICAL ASSAY OF FOXGLOVE.[1]

By Tschirch and Wolter.

Up to the present no reliable chemical assay of foxglove leaves has been devised, and the biochemical method has been more and more generally adopted. The chief constituents of the leaves are digitoxin, digitonin and digitaleins. Digitoxin, the separation of which has hitherto been made the basis of a chemical method of assay, is not a definite substance, but a mixture to which the name of pseudodigitoxin may be applied. Digitalin is a cardiac poison. Digitonin belongs to the saponin group. Digitalein is a group designation for the water-soluble glucosides, one of which (gitalin) produces the specific action of foxglove. The authors tested all the chemical methods of assay that have been proposed by determining the physiological activity of the substance isolated and weighed, and comparing it with the physiological activity of the leaves. They found in agreement with Ziegenbein and with Jermstadt, that the digitoxin content was not in proportion to the physiological activity of the leaves. Keller's process for the determination of digitoxin was carried through and the solutions tested at each step to ascertain where any loss might occur; it was found that five shakings

[1] *Schweiz. Apoth. Zeit.*, Vol. 56, p. 469. Reprinted from *The Pharm. Jour. and Pharm.*, April 12, 1919.

with chloroform were not sufficient to remove all the physiologically active substances; for this eight shakings were necessary. The physiological activity of the digitoxin obtained was, however, not proportionate to that of the aqueous solution before its removal, and the authors conclude from this and other experiments that the original solution contains the active and inactive substances in some form of combination which is broken up by the shaking with chloroform. By means of color reactions it was shown that various menstrua did not effect any separation of the glucosides contained in the leaves that might have been expected from their varying solubility when isolated; they appear, therefore, to influence one another's solubility. Leaves were then extracted with various solvents to determine which exhausts them best. Ether and carbon tetrachloride extract no active substances; chloroform, acetic ether, and benzene exhaust them partially; absolute alcohol, acetone, and amylic alcohol exhaust them completely, but the high temperature necessary for the evaporation of the amylic alcohol solution appears to produce partial decomposition. An objection to the use of acetone as also of alcohol is its miscibility with water; this, however, can be overcome by using a saline solution instead of water. Acetone is preferable to absolute alcohol, as the solution obtained is colorless. The authors finally propose the following method for the chemical assay of foxglove leaves: The leaves are first exhausted with ether, by which chlorophyll, fat and resin are removed. They are then treated according to Keller's method, but after precipitating with lead the glucosides are shaken out with acetone, the acetone solution being made to separate by adding sodium chloride. In this way a mixture of all the active constituents of the leaves is obtained, for which the authors propose the name of *pandigiton*. The physiological activity of the pandigiton obtained is, however, less than that of the corresponding quantity of the solution before its removal, although the solution left after its removal is quite inactive. Two explanations of this are possible, viz., either the separation has involved some change or the inactive substances in the liquid exert some favorable influence. Moreover, the weight of pandigiton obtained is not proportionate to the physiological activity of the leaves. Nevertheless, the authors claim that the acetone method is a chemical method of assay inasmuch as by it all the active constituents, and not the digitoxin alone, are separated and weighed.

LIPOVACCINES.[1]

Prophylactic inoculation of great masses of people against infectious diseases, such as typhoid, cholera, dysentery, plague and possibly pneumonia, has for years been an ideal in the minds of many sanitarians, especially those who have been in contact with the populous but disease-ridden oriental countries where even simple methods of sanitation have encountered opposition. Inoculation itself, however, has met so many practical difficulties that it has remained largely an unattainable ideal. With the vaccines heretofore used, a relatively severe local and general reaction followed the inoculation; and while the health officer, by means of a variety of expedients, might send home his first dose of vaccine, it was quite another matter to induce the subjects to come back for more. Nor has this been true in dealing with unintelligent communities only.

Ferran, so far back as 1885, inoculated thousands against cholera in Spain; the work of Haffkine with plague in India is well known; Shiga inoculated against dysentery in Japan, and the more recent work of Lister in South Africa against pneumonia also seems successful. The most pronounced results have been obtained with typhoid-paratyphoid vaccines. The severity of the reactions, however, has been sufficient to make mass application unpopular and therefore impracticable in civilian work.

Perhaps the use of lipovaccines will do more to solve the problem than any other factor. Le Moignic and Pinoy were the first to substitute oils for the physiologic sodium chloride solutions previously used in making vaccines, and the advantages of the change were obvious. Bacterial toxins and even endotoxins, to a degree, are lipotropic; and the fact that their toxic effects are inhibited when they are injected simultaneously with lipoids and lipoid-rich tissues, such as brain substance, has been explained on this basis. The lipoid-oil vehicle of the vaccine serves, therefore, not only in delaying absorption but very probably in some directly neutralizing manner. Indeed, Le Moignic and Pinoy found that they could inject three and four times the dose of the usual saline vaccine at a single injection of the lipovaccine without undue reaction and achieve an immunity that was on a par with that obtained following repeated inoculations with ordinary vaccines. The fact that bac-

[1] Reprinted from *Jour. of the American Med. Assoc.*, May, 1919.

terial vaccines prepared in oil do not deteriorate is also of decided value when mass vaccination is under consideration.

A lipodysentery vaccine has already been produced at the Army Medical School, and recently Fennel prepared a lipopneumococcus vaccine which, because of the simplicity of inoculation, will perhaps supersede the method of inoculation recommended by Lister.

An interesting application has been made, too, by Bossan and Le Moignic with a lipotuberculin. They find that such vaccines, containing either the complete suspension of tubercle bacilli or the filtered product of the dissolved material, are efficient as antigens and at the same time quite innocuous, so far as local and general reactions are concerned.

Of course, a number of technical problems have presented themselves in the mass production of these vaccines—matters of dosage and of the proper sterilization of oils, and the inclusion of efficient preservatives and antiseptics (all of our common agents are lipotropic and therefore of lessened bactericidal power in an oil menstruum), and their sale in interstate commerce has so far not been authorized by our government—but there seems little doubt that within a few years the use of lipovaccines will be of great assistance in prophylactic inoculation against a number of infectious diseases, a procedure which so far has been delayed because of the inherent toxicity of the available vaccines.

CHLORAMINE-T AS AN INTESTINAL ANTISEPTIC.[1]

The high antiseptic power and feeble toxicity of chloramine-T has suggested to P. Carnot and Th. Bondouy[2] the possibility of its use as an intestinal antiseptic. They report an elaborate investigation as to (*a*) its bactericidal action, (*b*) its toxic action, (*c*) its reaction with the digestive juices, (*d*) the best method for its administration; and they report a series of clinical researches on its use internally.

Bactericidal Action.—The bacilli of typhoid and paratyphoid are destroyed in twenty-four hours in a concentration of 1:5,000; the colon bacillus forms no culture at 1:1,000, while weaker concentra-

[1] Reprinted from *The Prescriber*, April, 1919.

[2] *Paris Med.*, 1918, 8, 468, Dec. 7.

tions are cultivated with difficulty on bouillon. The solution has no effect on *Entamœba histolytica.*

Toxic Action.—This is very slight indeed, and the drug may be prescribed without fear in quite large doses even for patients having a sensitive digestive tract.

Reaction with Digestive Secretions.—In contact with the saliva, chloramine-T is partially decomposed with liberation of small quantities of chlorine, but this decomposition is slow and may be disregarded. The gastric and duodenal juices both decompose the drug rapidly and completely, consequently it is necessary in administration to protect the medicament from the action of the stomach. The action of both gastric and pancreatic juices is inhibited by chloramine-T in a concentration of 1 : 500, but is not affected by 1 : 2,000.

Methods of Administration.—In accordance with these findings it is necessary so to administer chloramine-T as to reduce the rate of its absorption and prolong its contact with the intestinal contents. The authors find that animal charcoal satisfactorily accomplishes this, cachets or tablets containing chloramine-T 0.05 Gm. and powdered animal charcoal 0.3 Gm. being a suitable form, four such cachets or tablets being given daily. Another suitable adjuvant is powdered agar-agar, this being mixed in the same proportion as the charcoal.

Clinical research shows that in cases of gastric disturbance characterized by fetid stools and diarrhœa, the administration of 3 to 6 grains produces marked relief. Bacillary dysentery was quickly relieved with two doses of 0.12 Gm. Good results were also obtained in several cases of intestinal toxic infections, and in two cases of catarrhal icterus deodorization of the stools was complete, but the icterus was unaffected. In cases of chronic enterocolitis little result was obtained, and none in cases of amœbic dysentery. In one case of paratyphoid fever the result was inconclusive.

NOTE ON THE PREPARATION OF GLYCERIN BY FERMENTATION.[1]

Karl Schweizer has explained his experiments which led to a greatly increased yield of glycerin during the fermentation of sugar by yeast, and states that during the recent war certain of the belligerent countries have prepared their glycerin industrially by this method. As early as 1857 Pasteur found that glycerin was formed during alcoholic fermentation, and he obtained a yield of 3.60 to 3.64 parts for 100 parts of sugar fermented. Later it was found by Laborde that the quantity of glycerin formed varies with different races of yeast, and obtained as much as 7.75 Gm. from 100 Gm. of sugar. It has been found also that the amount of glycerin formed is greater in a medium rich in nutritive matters, and less in cases where the conditions are less favorable for the growth of the yeast plant. It was evident that the amounts of ethyl alcohol and glycerin were not proportional.

It was supposed by T. Erlich that glycerin could be formed from certain acid amines, as is the case with amyl and other higher alcohols, and thus its formation was attributed to the fatty matter that is found in little droplets in the yeast cells, but it was demonstrated later that the quantity of this fat was too small to explain the formation.

Oppenheim proved that glycerin can be formed by the reduction of glycerin aldehyde and of dioxyacetone, substances that are formed during alcoholic fermentation, and various hypotheses were made in regard to the intermediate products of the transformation of sugar into alcohol. It appeared plausible to the author that the use of reducing agents in the fermenting liquid might increase the yield of glycerin, and accordingly experiments were made, both in his laboratory and upon a technical scale. The greatest difficulty was to find a race of yeast that would withstand the conditions, but this was found in a commercial pressed yeast made from molasses. Powdered zinc in dilute sulphuric acid solutions did not give satisfactory results, and attempts with acid solutions were abandoned. The reduction in solutions as nearly neutral as possible by means of sodium sulphite in the presence of powdered chalk was studied

[1] *Helvetica Chemica Acta*, 2, 167. Reprinted from *Amer. Jour. of Science*, May, 1919.

and finally led to success, after the proper concentration of the sugar solution, the amounts of sulphite and nutrients had been determined.

After dissolving 40 Gm. of sugar, 2 Gm. of ammonium biphosphate and 1 Gm. of dipotassium phosphate in 400 Cc. of water, then adding 10 Gm. of pressed yeast, the beginning of the fermentation was awaited, and then sodium sulphite to the amount of 30 Gm. was added. After twenty-four hours the fermentation was finished, 800 Cc. of carbon dioxide had been given off, the liquid had a strong odor of vanillin, and 100 Gm. of sugar had produced 21.3 Gm. of glycerin as an average of several experiments.

THE 98TH ANNUAL COMMENCEMENT EXERCISES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

The interesting services commemorating the 98th Annual Commencement of the Philadelphia College of Pharmacy were observed during the first week in June. The baccalaureate service was held at the Church of St. Luke and the Epiphany on Sunday afternoon, June 1, the faculty and the graduates attended garbed in caps and gowns. The Rev. David M. Steele preached an enlightening and appropriate sermon.

The annual meeting of the Alumni Association was held at the college on Monday following. The officers elected for the ensuing year are: President, R. P. Fischelis; First Vice-President, Wm. D. Robinson; Second Vice-President, R. T. Blackwood; Recording Secretary, Jos. W. England; Corresponding Secretary, M. M. Smith; Treasurer, C. Carroll Meyer; Directors, E. H. Hessler, Ivor Griffith, J. W. Ehman, L. Gershenfeld, H. W. Youngken.

The faculty reception and dinner to the graduates was held in the college hall on the evening of the same day.

The Victory Reunion and Banquet of the Alumni Association took place at the Hotel Walton on Tuesday evening, June 3, and was one of the largest gatherings of the Alumni that ever assembled at these annual occasions. Dean LaWall was toastmaster and the following toasts were responded to: "The College Officers and Faculty," by Dr. A. W. Miller, who filled this assignment to President Howard B. French, whose attendance was prevented by illness;

"The Future of the College," by George M. Beringer; "The Soldier and Sailor Pharmacists," by Prof. Julius W. Sturmer; "The Navy," by Lieutenant W. T. Minnick, M.D.; "The Graduating Class," by President Otto L. Koenig, and "The Fours and Nines," by members of these special reunion classes.

The 98th Annual Commencement exercises were held at the American Academy of Music on Wednesday evening, June 4. President Howard B. French conferred the degrees and certificates.

The honorary degree of master of pharmacy, Ph.M., was conferred upon Harry Vin Arny, Ph.G., Ph.D., of New York; William August Puckner, Ph.G., Phar.D., of Chicago, and Heber Wilkinson Youngken, Ph.G., Ph.D., of Philadelphia.

The following degrees and certificates were awarded to the students in the courses.

DOCTOR IN PHARMACY (P.D.).

Name.	Thesis.	Wherefrom.
Hess, Mrs. Helen Way (P.C.)	*Organotherapy*	New Jersey.

PHARMACEUTICAL CHEMIST (PH.C.).

Braslavsky, Albert	*Sodium Salicylate*	Pennsylvania.

GRADUATE IN PHARMACY (PH.G.).

Name.	Thesis.	Wherefrom.
Abrahams, Samuel	*Elixir Terpin Hydrate*	Pennsylvania.
Altshuler, Samuel Benson	*Linimentum Calcis*	Russia.
Baker, Benjamin	*Gossypium Purificatum*	Pennsylvania.
Baker, John Luther	*Colloids*	Pennsylvania.
Berguido, Luis	*Adulteration of Matricaria Chamomilla by Anthemis Cotula.*	Panama.
Blackwood, Russell Thorn, Jr.	*Perfumery*	Pennsylvania.
Bloes, Walter Franklin	*American Grown Belladonna*	Pennsylvania.
Buchanan, Raymond Joseph.	*Incompatibility in Prescriptions*	Pennsylvania.
Collins, Amos Reeves	*Notes on Arnica Montana*	Pennsylvania.
Dixon, Hayes Merrill	*Starch Grains of Leguminosæ Family*	Pennsylvania.
Dorin, David	*Development of the Potassium Industry in the United States.*	Russia.
Emig, Herbert Martin	*Enteric Pill Coating*	Pennsylvania.
Eppley, Joseph Aloysius	*Preparations of Dichloramine-T.*	Pennsylvania.
Fasnacht, Allen Hornberger.	*Liquor Magnesii Citratis*	Pennsylvania.
Finkeni, Paul William	*Disinfectants and Their Uses*	New Jersey.
Friedman, William Leonard.	*Manna and Mannite*	Pennsylvania.

Goldin, Joseph Bernard	*Eusol and Eupod*	Russia.
Hellerman, Edward Mann ..	*The Use of Iodine in Treatment of Pyorrhea*	Pennsylvania.
Henrie, John Lewis	*The Cultivation of the Mushroom Commercially*	Pennsylvania.
Hoy, Wilbur Bloom	*The Characteristics of Angostura and Surinam Tonka Beans* ...	Pennsylvania.
Hughes, John Joseph	*The Histology of Xanthoxylum* .	Pennsylvania.
Hurst, George A.	*Pollen Extracts and Their Use* ..	Pennsylvania.
Josephs, Aaron Harry	*Purified Petroleum Benzin*	Pennsylvania.
Katsky, Jacob Herman	*Camphor and its Polariscopical Determination*	Russia.
Kiely, Eugene Ignatius	*Seidlitz Powder*	Pennsylvania.
Koenig, Otto Louis, Jr.	*Pharmaceutical Technique*	Pennsylvania.
Koffs, Joseph	*Pulverization of Boric Acid*	Pennsylvania.
Levin, Miss Sarah	*The Peppermint Industry*	Pennsylvania.
Liss, Miss Ethel	*Aerial or Gaseous Disinfection* ..	Pennsylvania.
McClure, Maurice Axe	*Eupatorium Perfoliatum*	Pennsylvania.
Mayer, Harry Oscar	*Digitalis Siberica*	Pennsylvania.
Meserofsky, Jacob	*Diphtheria Antitoxin*	Russia.
Molofsky, David	*The Quality of Drugs of American Manufacture*	New York.
Moyer, Lloyd Rickert	*Adonis Vernalis*	Pennsylvania.
Pachuta, Michael	*Tablet Triturate Bases*	Pennsylvania.
Pinsky, Miss Harriet Floren	*Soy-Beans*	Pennsylvania.
Posnansky, Maurice Albert .	*Drug Store Advertising*	Russia.
Price, Samuel Howard	*Passiflora Incarnata*	No. Carolina.
Promisloff, Israel Samuel ..	*Disadvantage of Sodium Bicarbonate Tablet in Liquor Magnesii Citratis*	Russia.
Randolph, John Roanoke ..	*Scutellaria and Its Substitutes* ..	Tennessee.
Reighter, William Erle	*Cocoanut Products*	Pennsylvania.
Reiter, George Hager		New Jersey.
Rodriguez, Pedro Manuel, Oquendo	*Carica Papaya*	Cuba.
Rohrbach, George William..	*Ipecacuanha*	Pennsylvania.
Sanders, Miss Annetta Mildred	*Bird Foods*	Maryland.
Scott, William Clement	*Paste*	Pennsylvania.
Seltzer, Joseph Pincus	*Serums and Vaccines*	Russia.
Silk, Jacob	*Ferrous Iodide in Syrup*	England.
Slipakoff, Samuel Albert ...	*The Olive and Its Oil*	Pennsylvania.
Smith, Albert H.		Pennsylvania.
Smith, Marcus Samuel	*Sterilization of Camphorated Oil.*	Pennsylvania.
Springer, Altha Raymond ..	*The Clinical Laboratory of the United States Army*	Pennsylvania.
Stam, Miss Lillian Roberts .	*Water Softening*	Maryland.

Trumbower, Russell Stanley. *Carrel-Dakin Solution* ..... Pennsylvania.
Ulmer, Albert Herman ..... *Extemporaneous Pill Coatings* .. Pennsylvania.
Waidelich, Harold Russell .. *Lobelia Inflata* ..... Pennsylvania.
Wallace, John Aloysius .... *Milk as a Clarifying Agent* ..... Pennsylvania.
Weinberg, Isadore Binder .. *Examination of Commercial Samples of Acetyl Salicylic Acid*.. Pennsylvania.
Williams, Daniel Thomas .. *Salvia Lavandulæ Folia Substituted for Salvia Officinalis* .... Pennsylvania.

CERTIFICATE OF PROFICIENCY IN CHEMISTRY.

Name.	Wherefrom.
Cunningham, Henry M.	Pennsylvania.
Dickhart, Wallace H.	Pennsylvania.
Feeny, Leonard A.	Pennsylvania.
Sunshine, Abraham J.	Pennsylvania.

SPECIAL CERTIFICATE IN ANALYSIS OF OILS, SUGAR AND WATER.

Duster, Elmer J., P. D. ..... Pennsylvania.
Nunez, Manuel Francisco ..... Peru.

SPECIAL CERTIFICATE IN CHEMICAL URINALYSIS.

Barreras, Fernando, Ph.G. ..... Porto Rico.
Nunez, Manuel Francisco ..... Peru.

SPECIAL CERTIFICATE IN COSMETICS AND PERFUMES.

Tamura, Sokichi ..... Japan.

CERTIFICATE IN BACTERIOLOGY.

Barreras, Fernando, Ph.G. ..... Porto Rico.
Beechwood, Miss Mary Elizabeth, Ph.G. ..... Pennsylvania.
Coolbaugh, Leonard E., P.D. ..... New York.
Dixon, Herbert Carlyle ..... Pennsylvania.
Glantz, Morris, Ph.G. ..... Russia.
Green, Samuel ..... Pennsylvania.
Griggs, Miss Anna Mae ..... Pennsylvania.
Londa, Miss Lena ..... Pennsylvania.
Luongo, Guy R., Ph.G. ..... New Jersey.
Mayer, Harry O. ..... Pennsylvania.
Nace, Earl Gray, P.D. ..... Pennsylvania.
Nunez, Manuel Francisco ..... Peru.
Ott, Miss Pearl M. ..... Pennsylvania.
Rodriguez, Pedro M. ..... Cuba.
Roth, Herbert J. ..... Pennsylvania.
Shute, Joseph, Ph.G. ..... Pennsylvania.
Smith, Marcus Samuel ..... Pennsylvania.
Stephens, Stanley R. ..... Pennsylvania.
Stock, Roy A., Ph.G. ..... Pennsylvania.
Weidman, Isaac S. ..... Pennsylvania.

Wells, Miss Eleanor H.	Pennsylvania.
Whalen, Miss Margaret R.	Pennsylvania.
Zajkowski, Anthony, Ph.G.	Pennsylvania.

SPECIAL CERTIFICATE IN TECHNICAL MICROSCOPY.

Nunez, Manuel Francisco	Peru.

CERTIFICATE IN PHYSIOLOGIC ASSAYING.

Name.	Wherefrom.
Cook, E. Fullerton, P.D., Ph.M.	Pennsylvania.
Harvey, Gilbert L.	Pennsylvania.
Goinez, LeRoy H.	Ohio.
Mayer, Harry O.	Pennsylvania.
Worrall, Wesley	Pennsylvania.

CERTIFICATE OF ATTENDANCE AT THE UNITED STATES NAVAL HOSPITAL CORPS TRAINING SCHOOL OF THE PHILADELPHIA COLLEGE OF PHARMACY, SECOND UNIT.

Name.	Town.	State.
Barker, Ernest Milton	Roseburg	Oregon.
Brandt, Frederick Eugene	St. Louis	Missouri.
Carlisle, John Edward	Washington	Pennsylvania.
Daube, Charles Frederick W.	Philadelphia	Pennsylvania.
Gilson, Howard Burbank	Edgewood	Pennsylvania.
Hale, Will Norris	Rockdale	Texas.
Hunt, Jesse Hamblet	Sisquoc	California.
Jones, John Edmund	Douglas	Arizona.
Kyner, John Harvey	Eustis	Nebraska.
Lee, Vernon	Stigler	Oklahoma.
Morris, Herbert Reed	Las Animas	Colorado.
Nevans, David Harold	Denver	Colorado.
O'Neill, Charles Henry	Webb City	Missouri.
Rathke, Arnold Leander	San Antonio	Texas.
Ryan, Charles Augusta	Portland	Oregon.
Sheppard, Allen Charles	Haleyville	New Jersey.
Shytles, Harrie Marcellus	Venus	Texas.
Stovell, George Reynolds	Caldwell	Idaho.
Sturgill, Virgle Leon	Ada	Oklahoma.
Taylor, Alfred Vernon	Denver	Colorado.
Traeder, Will Melrose	Pueblo	Colorado.
Waitman, Bryan Jennings	Redington	Nebraska.
Wersen, Harold Edward	Mt. Vernon	Washington.

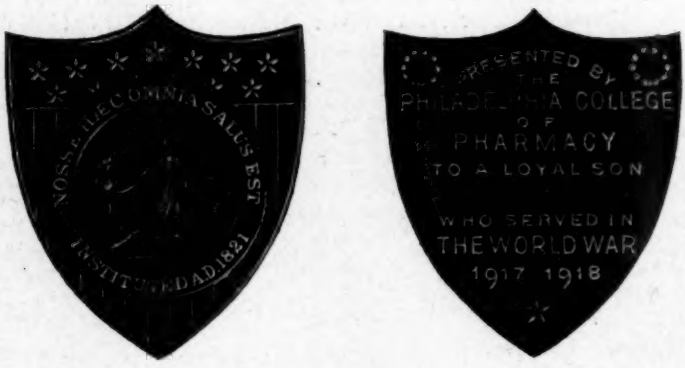
The first Unit of Hospital Corpsmen, a class of 162 enlisted men, completed their course at the College February 15, 1919, and a large number were given certificates and advanced naval rating.

The address to the graduates was delivered by Judge John M.

Patterson, and was a masterly presentation of true Americanism and advice which followed would lead to the highest type of useful citizenship and individual success.

A notable feature on this memorable occasion was the distribution with the programmes of the "Honor Roll of Graduates and Students of the Philadelphia College of Pharmacy who served in the United States Army or the United States Navy during the Great World War." The roll included nearly five hundred names of those who are known to have performed military service during this period. Possibly there are many more, of whose service for the country, the college has not yet been advised. Taps were sounded for the list of twenty names of former students who died in the service or were killed in action.

The following is a reproduction of a bronze medal or token of appreciation that has been prepared by the college and which will be presented to each graduate or student of the college who during this war has performed military or special service for the government. The medal will be sent to the family of such as have made the supreme sacrifice.



At the commencement, President French made the speech of presentation and Robert P. Fischelis responded, accepting the honor in behalf of those who had been in the service and pledging their continued loyalty to the nation and to the college.

NEWS ITEMS AND PERSONAL NOTES.

CASWELL A. MAYO, PH.M., REMOVES TO CINCINNATI.—Mr. Caswell A. Mayo, who for twenty-seven years has served as the editor of our esteemed journalistic contemporary, the *American Druggist and Pharmaceutical Record,* has severed his editorial connection with that journal and engaged with the William S. Merrell Company of Cincinnati.

Since his entrance as a student at the Philadelphia College of Pharmacy Mr. Mayo's career has been a series of distinguished services in behalf of the vocation that he selected for his life's work. His efforts have, from time to time, received merited recognition. His alma mater conferred upon him the degree of master of pharmacy, *honoris causa,* and the American Pharmaceutical Association elected him as president, 1914–1915. In addition, he has held many responsible positions in the New York College of Pharmacy and in the various pharmaceutical organizations. Not the least of his services to pharmacy have been the addresses and penned articles in favor of professional pharmaceutical work in the Army, Navy and Health Departments of the Federal Government with appropriate commissioned rank for pharmacists. Mr. Mayo carries with him to this new field of activities the high regards of a host of friends and their best wishes for a continuance of the high ideals that have characterized his past work and, if possible, that even greater personal satisfaction and success may attend him therein.

BURROUGHS WELLCOME MANAGER VISITS AMERICA.—George E. Pearson, F.C.S., general manager of Burroughs Wellcome & Co., London, England, is paying a visit to America and in his tours is taking in some of the interesting sights as well as calling upon friends and customers of his well-known firm. It was a pleasure to welcome him at the Philadelphia College of Pharmacy, on Tuesday, May 24, and to have him make a personal inspection of this institution.

DECEASE OF PROF. WILLIAM G. FARLOW.—On June 3, William G. Farlow, professor of cryptogamic botany at Harvard University, died at his home at Cambridge, Mass., aged 74. He was recognized as an authority in the botanical sciences, especially in the department thereof in which he had specialized and taught at Har-

vard. His publications and scientific contributions were of a high order of merit.

THE SUPREME COURT OF THE UNITED STATES SUSTAINS THE LEGALITY OF COLGATE CO.'S SELLING PLAN.—In an unanimous opinion filed on June 2 the United States Supreme Court has affirmed the judgment of the District Court of Virginia in sustaining the demurrer of Colgate Co. to the indictment brought against this firm by the Federal Trade Commission, alleging that their plan of selling was in violation of the Sherman Act, and dismissing the said complaint.

In reviewing this case the Supreme Court in the opinion states in part:

"No charge is made that any contract was entered into by and on the part of the defendant, and any of its retail customers, in restraint of interstate trade and commerce, the averment being, in effect, that it knowingly and unlawfully created and engaged in a combination with certain of its wholesale and retail customers, to procure adherence on their part, in the sale of its products sold to them, to resale prices fixed by the defendant; and that, in connection therewith, such wholesale and retail customers gave assurances and promises, which resulted in the enhancement and maintenance of such prices, and in the suppression of competition by wholesale dealers and retail dealers, and by the latter to the consuming public.

. . . . . .

"'The retailer, after buying, could, if he chose, give away his purchase or sell it at any price he saw fit, or not sell it at all, his course in these respects being affected only by the fact that he might by his action incur the displeasure of the manufacturer who could refuse to make further sales to him, as he had undoubted right to do.' And we must conclude that, as interpreted below, the indictment does not charge Colgate & Company with selling its products to dealers under agreements which obligated the latter not to resell except at prices fixed by the company.

"The position of the defendant is more nearly in accord with the whole opinion and must be accepted. And as counsel for the Government were careful to state on the argument that this conclusion would require affirmation of the judgment below, an extended discussion of the principles involved is unnecessary.

"The purpose of the Sherman Act is to prohibit monopolies, contracts and combinations which probably would unduly interfere with the free exercise of their rights by those engaged, or who wish to engage, in trade and commerce—in a word to preserve the right of freedom to trade. In the absence of any purpose to create or maintain a monopoly, the Act does not restrict the long recognized right of trader or manufacturer engaged in an entirely private business, freely to exercise his own independent discretion as to parties with whom he will deal. And, of course, he may announce in advance the circumstances under which he will refuse to sell. 'The trader or manufacturer, on the other hand, carries on an entirely private business and may sell to whom he pleases.' United States *v.* Trans-Missouri Freight Association, 166 U. S. 290, 320. 'A retail dealer has the unquestioned right to stop dealing with a wholesaler for reasons sufficient to himself, and may do so because he thinks such dealer is acting unfairly in trying to undermine his trade.' Eastern States Retail Lumber Dealers' Association *v.* The United States, 234 U. S. 600, 614. See also Standard Oil Company *v.* United States, 221 U. S. 1, 56; United States *v.* American Tobacco Company, 221 U. S. 106, 180; Boston Store of Chicago *v.* American Graphophone Company et al., 246 U. S. 8. In Dr. Miles Medical Company *v.* Park & Sons Company, supra, the unlawful combination was effected through contracts which undertook to prevent dealers from freely exercising the right to sell.

"The judgment of the District Court must be

"Affirmed."

This decision of the United States Supreme Court will undoubtedly have an important bearing upon the future course of the Federal Trade Commission and may even be considered a long step in the direction of modifying the interpretation placed upon the Sherman Anti-Trust Act or preferably its modification by legislation that will promote fair methods of trading and the restriction of unscrupulous price-cutting. The unanimity of the decision leaves no doubt as to the trend of public opinion. In an editorial comment when this suit was announced (see AMERICAN JOURNAL OF PHARMACY, March, 1918, page 160) the following statement was made: "It would appear to us that there is here *no evidence of intent to restrain trade.* The effort of Colgate and Company appears to be

to standardize, to stabilize prices in the interest of all concerned. The effect has been the very opposite of a restraint of trade. This plan has stimulated the interest of dealers and gained the confidence of the consumers and the actual result has doubtless been an increased consumption of the products of Colgate and Company. That such a plan, which is essentially a plan for 'fair trade,' working to the benefit of all the interests concerned, should be construed as a violation of any law enacted in the interest of fair trade appears to us as inconsistent and untenable."

ROBERT P. FISCHELIS PRESIDENT OF THE PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.—At the annual meeting of this association held at Buena Vista the latter part of June, Prof. Robert P. Fischelis was elected as the president for the ensuing year. For several years past he has been the efficient secretary and editor of its proceedings and publication, *The Pennsylvania Pharmacist.*

BOOK REVIEWS.

A TREATISE ON PRESCRIPTION INCOMPATIBILITIES AND DIFFICULTIES, including prescription oddities and curiosities. For pharmacists and physicians and students in pharmacy and medicine. By William J. Robinson, Ph.G., M.D., editor of the *Critic and Guide* and *The American Journal of Urology and Sexology;* formerly president of the New York Board of Pharmacy Institute, etc., 12mo, 263 pages, cloth, $3. New York, Critic and Guide Company.

This excellent contribution to the study of incompatibilities in prescriptions will be received with interest by all pharmacists who are proud of their professional training. The collection represents many of the modern synthetics in combination, and the explanations are interestingly written, and indicate investigation by the author.

It is true, many old and well-known incompatibilities are included, as they should be in any comprehensive study of the subject, but there are a number of the new combinations and interesting complications which every practicing pharmacist should know.

The author points out a fact which is being generally recognized, namely, that physicians are writing few composite prescriptions, the

tendency being toward the use of "simples," and therefore problems in incompatibility less frequently force themselves upon the compounder. There is always great danger of over-emphasis on this subject, since the physician resents constant change in his prescription, but the master prescriptionist is frequently able to gain the confidence of his physician friends by judicious and skillful use of his scientific training and cleverness in compounding mixtures in a compatible and elegant form.

This volume should find its place in the library of every active prescriptionist and will be of great value in clearing disputed points in prescription work.

E. F. C.

A Critical Revision of the Genus Eucalyptus. By J. H. Maiden, I.S.O., F.R.S., F.L.S., Government Botanist, New South Wales, and Director of the Botanic Gardens, Sydney. Vol. IV, Part 7.

The part 7, Vol. IV, being part XXXVII of the complete work, now at hand carries on this classic monographic treatment of the interesting Eucalypti, in the same manner and style as the preceding parts which from time to time have been reviewed in these pages. The species treated therein are *E. clavigera* A. Cunn with the various affinities and connecting varietal types; *E. aspera* F. v. M.; *E. grandifolia* R. Br.; *E. papuana* F. v. M. The excellent illustrations are of the same high order that appeared in all of the parts as published.

G. M. B.